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The impact of affirmative action on the gendered: Occupational segregation in South Africa

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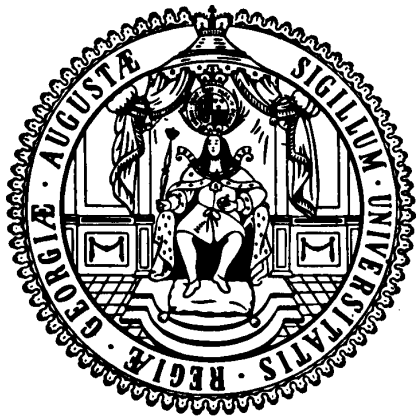

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The Impact of Affirmative Action on the Gendered Occupational Segregation in South Africa

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The Impact of Affirmative Action on the Gendered Occupational Segregation in South Africa*

Stephan Klasen[a] and Anna Minasyan[b**]

Abstract

This paper studies the impact of an affirmative action policy on occupational segregation by gender in South Africa. We estimate the effects of the Employment Equity Act of 1998, the Black Economic Empowerment Act in 2003 and the Codes of Good Conduct in 2007 on (Black) female employment in top occupations using individual level, repeated cross-section data of 21 years. The findings based on difference-in-difference-in-difference identification strategy show that the probability of Black female employment in top occupations increased after 2003, however it decreased after 2007. Overall, the effects are quite small. We offer several explanations for our findings.

JEL classification: J7, J16, J15, J18

Keywords: affirmative action; occupational segregation; gender; South Africa

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1 Introduction

Gender inequality in the labour market continues to be one of the most important aspects of gender inequality in developing countries. Gender gaps in participation have been reduced in many regions, but are still sizable (e.g. Gaddis & Klasen, 2014; World Bank, 2012). Much less progress has been made, however, in reducing pervasive occupational and sectoral segregation. In fact, cross-country analyses of occupational and sectoral segregation uniformly find that development (proxied by higher GDP/capita) has an insignificant effect on occupational or sectoral segregation by sex, even if it is associated with rising female labour force participation (e.g. Ball, 2008; Borrowman & Klasen, 2017; World Bank, 2012). This suggests that women entering the labour market are doing so mimicking the existing sex-specific distribution of occupations and sectors rather than breaking into male occupations and sectors. While it is unclear what causes this persistence of occupational and sectoral segregation, one clear negative impact is that it contributes substantially to gender wage gaps, as female-dominated occupations and sectors tend to receive lower pay than male-dominated ones, even after accounting for human capital and experience. As a result, it is not surprising that progress in reducing gender wage gaps (in particular the portion not attributed to human capital differences) has been very slow as well (e.g. Weichselbäumer & Winter-Ebmer, 2005; Seguino, 2000).

In industrialized countries, there have been many initiatives to explicitly increase female representation in particularly prestigious, highly-remunerated, or politically important occupations, including senior management of companies, company boards, senior positions in scientific and technical occupations, parliamentary representation, and senior positions in academia. A range of instruments have been used, ranging from various incentive and support schemes, mentorship programs to hard quotas (Marcus et al., 2016). In developing countries, much less attention has been placed on occupational and sectoral segregation by gender with the exception of political quotas which have been applied in various forms across many developing countries (Pande & Ford, 2009). At the same time, some countries have experimented with affirmative action for other reasons, usually to increase opportunities of previously disadvantaged groups, such as low caste and tribal groups in India (e.g. Bertrand et al., 2010), and Black Africans in South Africa after apartheid (e.g. Mathur-Helm, 2005; Lee, 2015).

The South African case is interesting as initially it included women of any race as targeted beneficiaries, alongside Black South Africans, in the Employment Equity Act of 1998. Later the Black Economic Empowerment Act of 2003 excluded White women from the beneficiaries. We exploit this change to evaluate the impact of Black Economic Empowerment Act of 2003 and a

subsequent initiative on Codes of Good Practice on Black female employment in top occupations. Although the affirmative action in South Africa does not directly aim at reducing occupational segregation by gender, nevertheless, it postulates equal representation of previously discriminated groups in all occupational categories. Moreover, in 2007 it set targets for Black female employment in high-skilled occupations and these occupations are heavily dominated by males within each population group. Therefore, we hypothesize that the affirmative action may lead to increased employment of Black women in top occupational categories compared to the pre-policy period as they are not only one of the beneficiary groups but also the ones treated more intensively in male-dominated occupations, such as the senior managerial positions. On the other hand, as has been found in India (e.g. Bertrand et al., 2010), it may be the case that affirmative action actually hurts Black women as the push to increase their representation may lead to Black males and White females being favoured over Black women.

We use difference-in-difference-in-difference estimation method with linear probability model and find no strong effects of the Employment Equity Act of 1998, although there is some evidence that is might have had a small positive effect with a delay. More robustly, we find the Black Economic Empowerment Act in 2003 had positive effect on Black female employment in high-skill occupations (comprising legislators, senior officials, and managers) whilst the specific targets set to benefit them in 2007 had actually an adverse effect, compared to the previous periods, leading to virtually no net effect of these policies taken together.

The paper is organized as follows. Section 2 links economic theories of discrimination, occupational segregation by gender and affirmative action. Section 3 presents the empirical evidence on effectiveness of affirmative action policies across countries. Section 4 describes the affirmative action policy in South Africa while Section 5 describes the data and discusses descriptive statistics. We present our identification strategy and method in section 6 and the findings in section 7. Section 8 concludes with policy implications.

2 Discrimination, occupational segregation, and affirmative action

Under apartheid in South Africa women and men were discriminated primarily along racial lines. All Blacks (African, Coloured and Indian/Asian) had restricted access to employment, education and housing. Formal restrictions existed until the 1980s, and then were progressively lifted while informal restrictions in access to education and employment persisted until the early 1990s. By apartheid law, the Blacks were segregated into specific areas of residence (townships and

so-called homelands) and were not allowed to live, study and work together with the Whites. The productive capital was in the hands of White men and Blacks were denied access to it (Tangri & Southall, 2008). Discrimination against White women was not based on similar codified restrictions. But in practice, White women were excluded from most types of formal employment based on the patriarchal ideas of women's place in society (Msimang, 2000). Consequently, White women were encouraged to learn nursing and teaching, and if employed, then mostly in secretarial and clerical jobs. Black women, on the other hand, were (informally) employed as domestic workers, cleaners and alike and, due to their need to work, they exhibited higher share of employment than White women. But they were similarly disadvantaged in the formal sector positions that were available to Blacks (Msimang, 2000). Clearly, apartheid curbed access to formal employment for all women and Blacks in South Africa; however Black women suffered the most as they carried the burden of all evils: apartheid, poverty and patriarchy (Msimang, 2000, Naidoo & Kongolo 2004). Thus, discrimination and segregation in South Africa took place on both fronts: race and gender, although the nature of discrimination took different forms.

After apartheid, the occupational segregation of Black and White females did not change much although female labour force participation among the both groups increased. A common feature among Black and White women in South Africa is the low levels of female employment in managerial (top-level) occupations, similar to the other parts of the world. There are different theories why such occupational segregation by gender takes place in spite of the increase in female labour force participation (Borrowman & Klasen 2017). Below we discuss some of these.

For example, according to Becker (1981), different biological roles of males and females and related preferences for childbearing- and rearing lead women to concentrate more on home production and invest less in own human capital. With increased female labour force participation, women would tend to self-select for those occupations (and sectors) that are more flexible and require less human capital investments, and allow employment interruptions and re-entries. As a result, occupational segregation by gender prevails. This theory however is based purely on the supply side, which reflects different choices of employees that lead to the gendered occupational segregation. And of course it presupposes an incompatibility with pursuing a career and family obligations for women with children, which will depend on opportunities and costs for childcare and other family policies (e.g. Gehringer & Klasen, 2016).

On the demand side, the neoclassical theory of discrimination (Becker, 1957) predicts that employers that have discriminatory preferences will be either driven out of business or would have to change their preferences (hiring practices), unless they enjoy substantial market power. Enhanced competition will increase the costs for discrimination as the competitors without taste for

discrimination will employ equally skilled at lower wages. Thus, gendered segregation should then be eroded in more competitive environments. However, if women mainly work for non-discriminatory employers then this theory predicts segregation between employers but not necessarily between occupations or sectors.

Feminist economic theories particularly highlight the role of gendering both in the supply and demand side of labour markets and institutions. Here different preferences and investment in human capital by men and women are not treated as exogenous as in Becker's theory but rather determined by the socialization of certain gender roles, which influences both the employers and employees. This implies that women's (gender) role as the primary caretaker (children and elderly) and supplier of unpaid labour in the home constrains women's equal participation in the labour market. Data shows that the recent increased female labour force participation in paid labour has not increased male participation in the unpaid labour in the home by much (World Bank, 2012).

Institutionalist theories suggest that males and mostly White male workers have been preferred for well-paid and secure jobs as historically they have had better educational access and more experience. In addition, these occupations have been reserved for men due to the male breadwinner bias. Women on the other hand, have been perceived as secondary workers, with less labour market options, lower wages and little opportunities for advancement and skill upgrade (Reich et al., 1973; Anker, 1998). [1]

According to models of statistical discrimination (e.g. Arrow, 1973), in a situation of incomplete information, employers judge prospective employees based on information on group-averages. If these group averages suggest, for example, that women tend to have lower job attachments than men, maybe due to greater care burdens within households, qualified women might not be hired or promoted regardless of whether they conform to this stereotype as they are unable to credibly signal their true job attachment. In this context, the concept of glass ceiling is particularly relevant for occupational segregation in managerial positions: It is a certain barrier along the occupational ladder beyond which only very few from disadvantaged socio-economic groups (i.e. women) can advance.

Thus, based on the above theories, one can expect that increased Black and White female labour force participation may lead to further increases in the occupational segregation by gender in South Africa, as was found in the cross-country evidence (Borrowman & Klasen, 2017). Moreover, if employers make hiring decisions based on (statistical) discrimination and (negative) stereotypes

[1] The division of labour by gender is present across countries but the gender typing of occupations is not as common as there are significant variations both within and across countries (Boserup, 1970; Charles and Grusky, 2004; Caraway, 2007).

and women in return internalize these stereotypes then the occupational segregation by gender will continue to persist in spite of the skills of the individual (Goldin, 2006). Moreover, Black women would suffer the most from discrimination based on sex and race.

Yet, the government can intervene with anti-discriminatory policies to reduce such segregation. Affirmative action is one of these policy tools that might be particularly effective in tackling differences in employment in occupations scarcely represented by previously discriminated groups. It was first introduced in India and the United States in the period from 1940s onwards (Burger et al., 2016) and has become one of the controversial state policy interventions in the labour market (Leonard, 1990). For example, some authors argue that affirmative action can be efficient or inefficient depending on the context (Leonard, 1984a; Coate & Loury, 1993; Krishna & Tarasov 2016). Leonard (1984a) regards an affirmative action policy as a tax on White male employment in compliant firms in the standard two-sector model. Leonard (1984b) modifies Becker's model of discrimination and shows that such taxation leads to efficient use of labour.

Coate and Loury (1993) model situations when affirmative action may either reduce or lead to persistence of discrimination and negative stereotypes by employers. The authors suggest that negative stereotypes can be a self-fulfilling prophecy for employers in the sense that it can lead ex-ante equally endowed but discriminated workers to invest less in own human capital and, thus, conform with employer beliefs, ex-post. Nevertheless, an affirmative action policy can reduce negative stereotypes permanently, if employers are willing to hire the disadvantaged group and the state subsidizes the disadvantaged group to invest and pass employer standards (equal for all groups) for high-skilled jobs. Without affirmative action, the costs for the disadvantaged group might be too high or the incentives too low.

However, Coate and Loury (1993) also show that affirmative action may lead to short term positive effects without reducing negative stereotypes. Hence, once the policy is removed the discriminatory situation prior the policy repeats itself. In particular, this takes place when the share of the disadvantaged groups is very small in the society and the employers lower their standards for the target group, hiring them at the same rate as the privileged ones (patronizing equilibrium). Yet, when the disadvantaged group is the majority in the society or the share is as large (as in the case of Blacks in South Africa and women) then such a strategy is suboptimal for employers.

Leonard (1990) suggests that a successful affirmative action should lead to two outcomes: increased employment of the disadvantaged (target) group and a reduction of discrimination. He proposes that an affirmative action is effective when it is strictly enforced, implemented with complimentary skill development policies, and with growing employment rates. Given South Africa's post-apartheid track record of low employment growth and high unemployment,

particularly among previously discriminated groups, it might therefore militate against large effects of affirmative action policies in this context (e.g. Klasen, 2002; Klasen & Woolard, 2009). Moreover, reports available from the B-BEE commissioner show that compliance is a serious issue since many firms are far from achieving the targets set by the state. In addition, there are no sanctions designed specifically for low compliance of firms in regards to B-BEE (Gqubule & Brown 2001; Reddy, 2008). Hence, based on Leonard's (1990) argument, with low compliance and in the absence of sanctions the affirmative action in South Africa can fail in achieving the desired outcomes, especially in the periods of high unemployment and reduced economic growth.

In the specific South African case (discussed in the next sections), policy was particularly concerned about redressing racial discrimination of the apartheid years. Thus, a primary emphasis was on race-based affirmative action. But even a race-based affirmative action policy can have impacts on occupational segregation by gender, if Black women receive particular attention in such a policy. In addition, some of the policies explicitly included (Black) women as targets of affirmative action that could have direct effect in sectors where women are under-represented.

In the next section we discuss empirical literature on the effects of affirmative action policies in India, United States, Malaysia and South Africa.

3 Empirics on affirmative action policies

Several countries around the world have introduced affirmative action policies to combat intersectional inequalities in employment and education (Sowell, 2004). In India the affirmative action since 1950s establishes quotas for historically discriminated castes. It ensures their admission to public educational institutions and employment in public sector. The empirical findings on the effectiveness of Indian affirmative action are mixed. Cassan (2011) finds the educational attainment by the beneficiaries from 1936 to be negligible compared to those who became beneficiaries in 1976. Heyer and Gopal Jayal (2012), on the other hand, find that the gap between the beneficiaries and non-beneficiaries has narrowed; however, there still exist barriers for finding suitable employment. Frisancho and Krishna (2016) argue that beneficiaries are displaced in academic programs by presenting an evidence for the mismatch theory as a consequence of the affirmative action in India. In contrast, Surendrakumar et al. (2016) do not find such evidence. In reply to the critic of affirmative action of reducing productivity, Deshpande and Weisskopf (2014) analyse the productive efficiency in Indian Railways, the largest firm employing policy beneficiaries, and find no evidence for such an effect.

The beneficiaries of the affirmative action in the United States (US) have been Black minorities and women (Title VII of the Civil Rights Act of 1964), measures of which include university admissions and employment via federal contractors. Leonard (1984c) finds that the policy significantly improved the employment of Blacks, with even larger effects for Black females. He finds no evidence for significant improvement of White female employment due to the policy. Kurtulus (2015) analyses the impact of affirmative action in the US on employment of minorities and women from 1973 to 2003, exploiting the variation of firms in the timing of their federal contracting. She finds that the shares of Black and Native American women and men in the firms increased rapidly in the first four years of becoming a contractor. However, the largest impact occurred in 1970s and 1980s and started to decline thereafter. By now, some of the states in the US have banned the affirmative action for university admissions. Hinrichs (2012) estimates the effects of the ban on college admission and educational attainment by exploiting time and state variation in bans. He finds no differential effects for a typical college or a student but for selective colleges (top tier) he finds that the ban decreased the share of underrepresented groups and increased the share of White (majority) enrolment. Furthermore, he shows that for some cases (University of California), the ban shifted the share of minority groups from selective colleges to less selective ones.

The affirmative action in the United States and India are aimed at minority groups whereas in Malaysia the policy, embedded in the Constitution (Article 153), promotes the majority of population – indigenous Malays – who have been disadvantaged during colonial times, similar to the case of South Africa (Guan, 2005).[2] The New Economic Policy introduced in 1971 by the government aimed at improving the representation and opportunities of the Malays (Bumiputeras) in education, employment, enterprise management and ownership through quotas (Lee 2015). The timing of the affirmative action was complemented with social development programs by the state and coincided with rapid economic growth, which helped achieving the educational targets. However in terms of top level occupations in private sector there has been a lack of a specific policy that would promote equal occupational representation (relative to shares of economically active population) across various industries (Lee, 2015). In addition, doubts about the quality of tertiary education obtained from domestic universities, where most Bumiputeras receive their education, create barriers for employment in the relevant occupations in the private sector (Lee, 2015; World Bank, 2009).

In contrast to Malaysian case, South Africa formalized the access to equal employment for previously discriminated majority of population (Lee, 2015) – Africans, Coloured, Indian/Asians,

[2] Chinese and Indian minorities have been the most advanced economic groups in Malaysia.

women and disabled individuals – by adopting the Employment Equity Act (EEA) in 1998, followed by Broad-Based Black Economic Empowerment Act of 2003 (B-BEE), which excluded White women from the beneficiaries. The affirmative action is promoted in the private sector by giving preferential treatment to medium- and large sized firms when dealing with the state (procurement services, licensing, and certification). However, the South African affirmative action is not complimented with social development programs and public expenditures nor does it establish quotas for Blacks at the universities (Lee, 2015). Although, some affirmative action programs have been implemented in tertiary level that aim at increasing the share of historically disadvantaged population in historically advantaged (mostly White) universities. The universities in South Africa, per se, are autonomous and can individually decide how to deal with the transformation. Also, one should point out that the economic context of implementing affirmative action in South Africa was very different to Malaysia's. In Malaysia, these policies were implemented during a three-decade economic boom with per capita growth rates of 3-5 % per year for most of the time period. In South Africa, they were implemented in a context of only moderate growth with little per capita growth and very high unemployment, which have been above 20% throughout the past 20 years.

There are a limited number of empirical studies that evaluate effects of affirmative action in South Africa on labour market outcomes and wage differences along racial and gender lines (see Burger et al. 2016 and the literature in there) but none of them look at the effects on occupational segregation by gender in top (managerial) categories. In terms of the wage gap, the evidence shows that the year 2003 was a turning point for narrowing the gap between Blacks (a generic term for African, Coloured and Indian/Asian as per definition in the affirmative action policy) and Whites in South Africa. The wage gap started to decline in 2005, especially for Black males who experienced a decline in discrimination due to increasing returns to their expanded access to tertiary education (Burger et al., 2016).

As described in section 4, the affirmative action policy in South Africa is a unique case for evaluating its impact on top level occupational segregation by gender and race as it aims at equal representation of Blacks females in business ownership and management as well as sets specific targets for Black women's representation in top occupations. Based on the Codes of Good Practice (2007), the calculation of scores is adjusted for gender, which promotes compliant firms for advancing Black women, and penalizes them for the opposite. The firms, however, do not receive any points in advancing White women, although they are included in the EEA (Burger et al., 2016).

Furthermore, employment surveys before and after the policy in South Africa give an opportunity to analyse gendered occupational segregation using microeconomic data on individual

level. At the cross-country level, the evidence show that rising labour force participation increases occupational but reduces sectoral segregation (Borrowman & Klasen, 2017).[3] It is essential to emphasize that labour market segregation is not always beneficial for men and detrimental for women because the outcomes can vary for different groups of women and men (i.e. social class, race, age, nationality and etc.).

To our knowledge, this is the first study to evaluate the impact of affirmative action on occupational segregation by gender and race using individual level data as the bulk of empirical literature on the occupational/sectoral segregation by gender uses macroeconomic data and aggregate level analysis. Hereby, we also contribute to the larger relevant literature by evaluating the impact of macro-level policy using micro-level outcomes. The next section outlines the affirmative action policy in South Africa in detail and presents the rational for this impact evaluation.

4 Affirmative Action in South Africa

After a four year transition period, in 1994, the first democratic elections including all races took place in South Africa leading to the formation of the ANC-led government under Nelson Mandela. In order to tackle the legacy of apartheid discrimination in the labour market, the Employment Equity Act 55 of 1998 (EEA) came into operation in 1999 with an aim to establish equity among all races in the workplace. According to EEA it a) prohibits and eliminates unfair discrimination that can adversely affect the designated groups and b) designated employers should ensure equal representation of designated groups in all occupational categories and levels of employment (Balshaw & Goldberg, 2008).

Designated groups include Africans, Coloureds, Indian/Asians (altogether defined as *Blacks* in the Act and also in this paper), women (including White women) and people with disabilities. Designated employer is one who employs more than 50 employees or has a yearly turnover above

[3] However, other cross-country studies do not find such a pattern (Semyonov and Jones, 1999; Chang, 2004) whereas Charles (1992) finds a positive relationship only for industrialized countries. In terms of differential human capital investment, most cross-country studies do not find a significant relationship between women's education and occupational segregation (Semyonov and Jones, 1999; Meyer, 2003; Chang, 2004; Swanson, 2005), with the exception of Jacobs and Lim (1992) who find a significant and positive relationship.

Another barrier for women's equal participation in all occupations is that women continue to carry the majority of responsibilities for childcare, which constraints their occupational choices. On the demand side, employers may be reluctant to fund maternity leaves, which can make women costly employees. Hence, one can expect positive relationship between fertility and gendered occupational segregation. Jacobs and Lim (1992), Anker (1998) and Ball (2008) find a statistically significant and positive relationship between fertility and occupational segregation, while both Chang (2004) and Swanson (2005) do not find any significant relationship.

the threshold defined in the Act (schedule 4) for each sector. The provisions of the Act apply to the public sector directly, excluding army and state security services. However, enterprises should prove their compliance with the EEA when doing business with the state (procurement, licensing, certification and etc.) A non-compliant enterprise faces R1 million fines (Balshaw & Goldberg, 2008) according to EEA legislation.

There are no quotas or targets stipulated by the EEA itself.[4] Designated employers decide individually on their goals and targets, after consulting with employees and trade unions. Thereafter, they report to the Department of Labour and Employment Equity Commissioner at least once per two years on their progress in achieving employment equity targets (Burger & Jafta, 2010).

Practically, the initial motivation of Employment Equity Act was to remove discrimination and promote affirmative action in the labour market. But this policy did little to change the ownership structure of companies and disproportionate control of Whites of the vast majority of the private sector. To address this, on January 6, 2004 the Broad-Based Black Economic Empowerment Act 53 of 2003 (BEE) became effective. The Broad-Based BEE aims to economically empower all Black people by a) increasing number of Black people who own, control and manage productive assets, a) reaching equity in employment and skill development, c) achieving equal representation of Blacks in all occupations, among others. The designated group in the BEE is defined similar as in the EEA, however it excludes White women (hence, it includes all Black people, Black women, Black workers, Black youth, Black people with disabilities and Black people living in rural areas) (Balshaw & Goldberg, 2008).

Among its objectives for promoting Black people, the Broad-Based BEE specifically intends to promote Black women in owning and managing enterprises, having access to employment, infrastructure and skill development (Balshaw & Goldberg, 2008; Burger et al. 2016). According to BEE Act of 2003, each designated employer was evaluated based on the *Balanced* scorecards on measures taken to fulfil the affirmative action. The Balanced scorecards included three main components for compliance: direct empowerment of Blacks via ownership and management control, 2) human resources and skill development, and 3) indirect empowerment. On Balanced scorecards all points were weighted equally in all the three categories and there are no targets or quotas set by the state, as the employer itself had to come up with goals and targets, which in practice should have matched the group shares in economic active population (ibid).

[4] Although media seems to understand equal representation as a quota equal to the share of each population group as recommended by the African National Congress party: http://www.economist.com/news/briefing/21576655-Black-economic-empowerment-has-not-worked-well-nor-will-it-end-soon-fools-gold.

The Codes of Good Practice for the Broad-Based BEE became effective on February 7, 2007 (BEE07). Before 2007, the designated employers were evaluated based on Balanced scorecards, however the Codes of Good Practice established a new *Generic* scorecard for employers, which included Employment Equity as one of its seven elements. The Generic scorecard does not balance all points across all dimensions but rather gives different points for different empowerment elements. [5] The most relevant elements for this study on the Generic scorecards are the targets set for Ownership, Top Management and Employment Equity. In addition, for the first time, bonus points and target quotas are set for Black female employees. In ownership allocation the target is 20% for Black females. In board participation, the compliance target for Black females is 50% and in top management it is 40%. Moreover, the points are calculated based on Adjusted Recognition for Gender formula, which promotes Black females employment and punishes the deficiency of it. As mentioned before, there are no additional points for hiring White women. The targets for employees outside of management and boards are set by each employer individually, and in practice it would correspond to the labour force participation rate of the specific disadvantage group as before (see footnote 4).[6]

Thus, in contrast to EEA and Broad-Based BEE Act in 2003, the Codes of Good Practice of 2007 set special targets for Black female representation in senior and managerial occupations along the 10-year period (targets vary from 5-year to 10-year). According to Balshaw and Goldberg (2008), indeed, due to the Adjusted Recognition of Gender calculations in Generic Scorecards many employers who perform short in terms of gender balance in employment have much lower scores. The BEE status certificates are valid for one year period.

Although, the EEA and BEE acts do not directly aim at reducing occupational segregation by gender in South Africa, nevertheless, we expect an increase in the shares of Black females in top-level occupations, which is male-dominated within White and Black population groups. We expect the effects to be stronger especially after 2007, assuming the affirmative action is implemented accordingly and attempts have been made to achieve the targets. Beyond Black females, one can expect an increase in White female's employment in top occupations from 1999-2003 before BEE came into operation, since the reasons for excluding White women from the act was their preferential employment at the expense of Black females.

[5] Direct empowerment: Ownership (20 points), management control (10 points). Human Resources Development: employment equity (15 points), skills development (15 points). Indirect Empowerment: Preferential procurement (20) Enterprise Development (15) and Socio-Economic Development (5 points).

[6] In general, an enterprise that scores less than 30 points is defined as Non-compliant contributor to the BEE. While micro-enterprises that have R5 million or less turnover can be exempted from the BEE with an automatic status of "Level Four Contributor. „In total there are 8 levels of contributors. If the exempted micro enterprise has more than 50% Black ownership, then it will be advanced to the status of level 3 contributor.

Hence, in this study we control for the effects of EEA in 1998 and BEE in 2003 and investigate how the Codes of Good Practice (2007) of affirmative action affected Black female employment in top occupational categories compared to the pre-policy periods.

Next section discusses the data and descriptive statistics.

5 Data and descriptive statistics

We use the Post-Apartheid Labour Market Series, version 3.1, acquired from DataFirst at the University of Cape Town, which was collected by Statistics South Africa. It is an integrated dataset of October Household Surveys 1994-1999, bi-annual Labour Force Surveys from 2000-2007 (LFS) and Quarterly Labour Force Surveys from 2008-2015 (QLFS). It is an individual-level, repeated cross-section data of 21 years, including variables on demographics (age, marital status, education, and employment) and labour market characteristics such as occupation and sector, formal and informal employment, size of the employer. The whole dataset includes 5,059,878 observations. Following Burger and Jafta (2010), for the sake of consistency we keep the September waves of LFS and QLFS and drop the waves conducted in other months (seasons) of the year (sample reduced to 2,203,983). Regarding occupation types, we exclude skilled agriculture and fishery workers to be consistent with the larger literature on occupational segregation analysis (Anker, 1998); only 2.5 percent of sample holds an occupation in agriculture and fishery. Further, we exclude females and males below 25 and above 60 years, and, thus, keep the working age population. We also exclude all self-employed individuals. Our final data includes 375,921 observations out of which 18,040 are employed in top occupational category, which comprises legislators, senior officials, and managers.

Table 1 presents key characteristics of South African labour market in 1997 and 2015 disaggregated by gender and population group for individuals aged 15-60 who are either employed or looking for a job (labour force). It excludes the economically inactive population. As the data shows, Africans have the largest share in labour force in South Africa around 70 percent; however they also have the highest unemployment rates (25 percent on average), whereas Whites constitute around 10 percent of the labour force with the lowest unemployment rates, on average 0.3 percent. Before the first affirmative action policy in 1997 African females had the highest unemployment rate, which was only slightly reduced in 2015, moreover the unemployment gap between African males and females before the policy was around 11 percentage points, which has been reduced to around 5 percentage points in 2015. In terms of schooling, African men and women experienced

increase in number of years of education by 2 years on average. While the education gap between African males and females before or after the affirmative action is minimal, there is a large education gap between population groups where the average years of education for Whites is around 12 years in 1997 and 13 year in 2015. The table also shows that the unemployment rate for White women remained stable (and low), while for African women it decreased by1 percentage points. Similar patterns can be observed for Indian/Asian and Coloured groups whereas Indian/Asian group show higher unemployment and less schooling than Whites but lower unemployment and more schooling than Africans and Coloured. That is, based on these statistics we can conclude that there is correlation between the affirmative action policy and an increase in female participation and a reduction in the unemployment gap. But this does not say much about women's opportunities to enter the top occupational category of legislators, senior officials, and managers. Also noteworthy is the low labour force participation rate of only around 50% for males and females in the 25-60 age group.

Table 1 – The labour market characteristics in South Africa by gender and population group

Year		1997			2015		
Gender	Population Group	Group shares	Years of education	Unemployment rate	Group shares	Years of education	Unemployment rate
Male	African	37.42	7.51	0.18	41.18	10.05	0.23
	Coloured	8.76	7.77	0.09	4.90	9.92	0.19
	Indian/Asian	2.06	10.96	0.07	1.64	12.33	0.10
	White	6.62	12.04	0.02	4.40	13.17	0.04
	Average share in labour force	54.86			52.13		
Female	African	32.66	7.87	0.29	38.49	10.33	0.28
	Coloured	6.86	8.11	0.13	4.67	10.46	0.21
	Indian/Asian	1.05	10.80	0.08	0.99	12.77	0.11
	White	4.56	12.09	0.05	3.72	13.35	0.05
	Average share in labour force	45.14			47.87		

Note: Group shares mean share of each gender and race group in the labour force. For example, 37% percent of labour force aged 25-60 is African male in 1997. Average share in labour force refers to share of males and females. For instance, in 1997 females (all races) comprised 45% of labour force in the sample. Source: PALMS 3.1. Authors' own calculations.

Table 2 provides participation shares in each occupation by population group in the period before the affirmative action, 1994-1997, and in the years after all three policies have been implemented, 2011-2015. In both periods Elementary Occupations, which are low paid blue-collar jobs, are the largest occupation for Africans; however in 2011-2015, Africans increased their share in most occupations, particularly in Service and Shop Workers occupations. Similar patterns can be

observed for Indian/Asians and Coloured populations groups. Whereas most Whites are engaged in top four occupational categories while their representation in lower occupational categories is close to zero. In terms of the top occupational category (Legislators, senior official and managers) the share of non-White population is 2.2 percent of all employed while for the Whites it is 2.6 percent of all employed before the policy, i.e. there are more Whites than Blacks in this top occupation in 1994-97. Since Whites constitute only around 11 percent of labour force as shown in Table 1, it is an indication of how over-represented they are among this group. After the affirmative action, in 2011-2015, the size of the top occupational category increased roughly by 1 percentage point of all employed. The shares of Africans, Indian/Asians and Coloured in these occupations also increased around 1.6 percentage points while the share of Whites decreased by 0.26 percentage points. Whites remain vastly over-represented in this group, but less so than 20 years earlier. Interestingly, Whites have lost greater employment shares in most other occupations suggesting that they were better able to hold on to the most coveted occupation 1.

Table 3 shows that for all population groups the share of females in top occupational category is less than 40 percent within each group. The largest gender gap in the high level positions is for the Indian/Asian population group before and after the affirmative action. However, after the onset of the affirmative action the share of females increased in the top occupations for all population groups. Moreover, the average increase for Black females (African, Coloured and Indian/Asian) and White females is each 12 percentage points. Among the previously discriminated female groups the largest increase is for African females, 16 percentage points.

In sum, the descriptive statistics show that after the affirmative action the likelihood of employment has improved for females in all occupational categories, including high level occupation. In order to disentangle the effect of the affirmative action from other causes of this trend we analyse the data using regression analysis and difference-in-difference estimation identification strategy, which we describe in the next section.

Table 2 – Participation share by occupation and population group in SA

Occupational categories in SA (excluding skilled agriculture and fishery workers)[7]	1994-1997					2011-2015				
	African	Coloured	Indian/Asian	White	Total	African	Coloured	Indian/Asian	White	Total
1. Legislators, senior officials and managers	1.16	0.50	0.47	2.60	4.73	2.04	0.77	0.45	2.34	5.60
2. Professionals	3.34	0.66	0.48	2.54	7.00	2.82	0.69	0.35	1.78	5.64
3. Technical and associate professionals	4.97	1.24	0.67	3.26	10.15	7.56	1.75	0.51	2.23	12.05
4. Clerks	4.53	1.88	1.26	4.39	12.05	7.07	2.01	0.62	2.09	11.79
5. Service workers and shop and market sales workers	7.69	1.88	0.84	1.85	12.25	11.82	1.69	0.34	0.84	14.69
7. Craft and related trades workers	6.53	2.68	0.82	2.66	12.69	7.30	1.51	0.19	1.04	10.04
8. Plant and machine operators and assemblers	8.58	2.23	0.83	0.83	12.48	7.47	1.29	0.21	0.26	9.22
9. Elementary Occupation	14.63	5.29	0.27	0.49	20.68	18.00	3.40	0.12	0.26	21.79
10. Domestic workers	6.55	1.31	0.04	0.07	7.97	8.24	0.94	0.00	0.01	9.19

Note: This table refers to the share of each group among all employed persons, i.e. of all employed (outside of agriculture and fishery), 1.16% of all employed are Africans in occupational category 1 in 1994-1997.

Table 3– Female shares in each occupation

Occupational categories in SA (excluding skilled agriculture and fishery workers)	1994-1997				2011-2015			
	Share of females in each occupation by population group				Share of females in each occupation by population group			
	African	Coloured	Indian/Asian	White	African	Coloured	Indian/Asian	White
1. Legislators senior officials and managers	0.23	0.34	0.15	0.25	0.39	0.40	0.29	0.37
2. Professionals	0.58	0.55	0.39	0.45	0.54	0.54	0.44	0.47
3. Technical and associate professionals	0.61	0.56	0.36	0.46	0.64	0.58	0.51	0.59
4. Clerks	0.52	0.67	0.50	0.80	0.69	0.73	0.68	0.86
5. Service workers and shop and market sales workers	0.43	0.56	0.33	0.43	0.48	0.59	0.38	0.40
7. Craft and related trades workers	0.16	0.14	0.18	0.05	0.13	0.14	0.06	0.04
8. Plant and machine operators and assemblers	0.12	0.29	0.27	0.08	0.12	0.26	0.18	0.09
9. Elementary Occupation	0.26	0.33	0.26	0.30	0.44	0.41	0.36	0.17
10. Domestic workers	0.81	0.79	0.47	0.56	0.96	0.98	1.00	1.00
Female share in participation by pop group	0.38	0.42	0.33	0.43	0.49	0.50	0.43	0.49

[7] The average share of population in this occupational category is 2.72 percent for the whole study period: the smallest occupational group.

6 Method

We use a difference-in-difference-in-difference (DDD) method to disentangle the effects of various affirmative action stages in the propensity of employment in top occupation for Black females. As described in the sections above, the first stage of the affirmative action, EEA of 1998, included both White women and Black women and men. However, the second stage of the affirmative action, BEE Act of 2003, excluded White women from its beneficiaries.

Difference-in-difference techniques are often used for policy evaluations. In its simplest form, the outcome variable is observed for two groups in two periods, before and after the treatment and in the second period only one group receives the treatment. The crucial assumption here is that in the absence of the treatment both groups would have evolved in a similar pattern (parallel trends assumption). The identification of the treatment effect is established by taking the difference in the mean change in the outcome between treatment and control group before and after the treatment (policy). This way, one eliminates the bias in the second (treatment) period that is due to the structural differences trends for the two groups.

In this paper our aim is to evaluate the impact of various stages of affirmative action policy on the likelihood of employment of Black females in top occupations. Blacks in South Africa are structurally different from Whites, related to different exposure to apartheid and to education. However, in terms of occupational segregation by gender both Black and White women show similar trends (Figure 1). Since the BEE excluded White women and further promoted Black women, we treat White women as a control group and Black women as the treatment group. When taking the difference in outcomes between Black and White females, we eliminate the structural differences that is due gender that has nothing to do with the policy. Black males were also treated by the policy but since they have higher shares in top occupations compared to females we regard the intensity of the treatment to be lower for them. Thus, we treat Black males as the second control group, which eliminates the confounding trends affecting all Blacks in South Africa (e.g. education policies or other changes that affected all Blacks in general).

In addition, we define three (in some specifications only two) different treatment periods: Before and after EEA, before and after BEE in 2003 and before and after Codes of Good Practices of BEE in 2007.

In result, we end up with difference-in-difference-difference (DDD) estimator with three (two) coefficients of interests, which can be expressed as follows:

$$\widehat{\beta_\iota} = \left(\bar{y}_{B,F,2} - \bar{y}_{B,F,1}\right) - \left(\bar{y}_{W,F,2} - \bar{y}_{W,F,1}\right) - \left(\bar{y}_{B,M,2} - \bar{y}_{B,M,1}\right), \qquad (1)$$

where subscript $i = (1,3)$ denotes three different stages of affirmative action policy, y denotes the outcome variable, the average (likelihood of) employment in top level occupations, and β is the coefficient of interest (the treatment effect). Subscript W denotes the White population group that was not exposed the treatment, specifically to the BEE in 2003 (BEE03) and Codes of Good Conduct in 2007 (BBE07). B denotes Black population group since they are all beneficiaries of the policy, however for the high skilled occupations we view Black males as indirect beneficiaries due to their overrepresentation in this category compared to Black females. Subscripts F and M denote female and male sexes accordingly.

Our DDD estimator aims at removing two types of confounders: changes in female employment in top occupations across Black and White population groups that have nothing to do with the policy and changes in the status of Blacks in general due to other policies or factors.

One might argue that the choice of Black men as control group is problematic since this group is treated by all three policies. Therefore, we specifically focus on the employment in top occupational category in which case the treatment intensity for Black males should be lower due to their overrepresentation in these occupations relative to Black females. In addition, gender-adjusted calculations introduced after 2007, should make this difference in intensity of treatment larger in the case of strict compliance.

The estimation equation for the regression analysis at the individual level with three policy stages and groups can be expressed as follows in a general form:

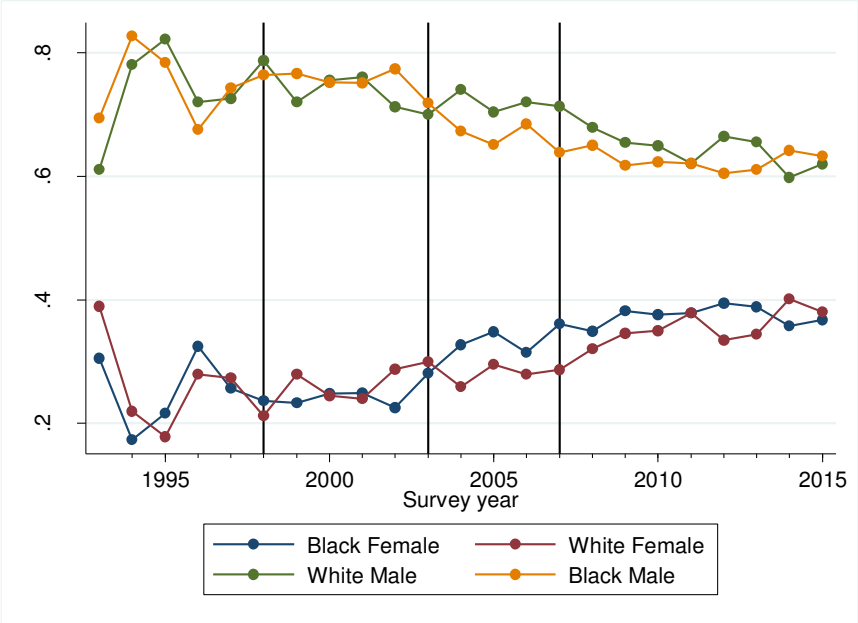
$$y_{iGT} = \alpha_G + \delta_T + X_{GT}\beta + z_{iGT}\theta_{gt} + u_{GT} + \varepsilon_{iGT}, i = 1, \dots N_{GT}\,, \qquad (2)$$

where i indexes individuals, g indexes group (Black, White, female, male), and T index policy periods. In particular α_G captures group effects, δ_T captures treatment period effects, X_{GT} captures group/treatment effects (policy variables), z_{iGT} – individual specific covariates (observables), u_{GT} – unobserved group time effects, and ε_{iGT} - individual specific errors. We are interested in estimating β which is expressed in (1). We assume individual specific errors are independent of individual specific covariates $E(z_{iGT}\varepsilon_{iGT})=0$ as and also include the observable and relevant individual-specific covariates in the regression analysis. We estimate the equation in (2) using a linear probability model. The outcome, y, is a binary variable that equals 1 if the individual is employed in a top occupational category and 0 otherwise (any other occupation as listed in Table 2 or unemployed)[8].

[8] The results do not change when we exclude the unemployed.

However, the identification strategy in (2) may still suffer from several biases (Abadie, 2005) since the individual-specific error term, ε_{iGT}, is composed of time-invariant individual effects, ε_i, time effects common for all the individuals (macroeconomic effects), γ_T, and time-varying individual and group specific effects, ϵ_{iGT}.

Figure 1 – Trends in employment in top occupations before and after the policy stages



Note: The chart shows the share of females and males in top occupations among its race group (i.e. the share of white women and men and Black women and men each sum to 100%).

First, the temporary individual and group specific effects are a concern when a policy is directed towards a specific group and individuals can self-select themselves into this group. However, since the affirmative action policy is based on race and gender, individuals cannot self-select into certain racial and gender group – it is exogenously determined by birth, hence, this bias can be ruled out.[9] Second, we remove the bias rising from the common macroeconomic effects affecting all individuals by including a time trend in the regression analysis to control for the overall direction of employment in top occupational categories across the time.[10] Moreover, in Figure 1 we can see in the most recent pre-treatment period 1997-1998 White females and Black females exhibited the same trend. In the next section we present DDD estimation results and interpret the findings.

[9] Although, in the case of an affirmative action policy in Brazil, individuals self-reported a different race to become program beneficiaries. To our knowledge, such practice is not common in South Africa, i.e., whites do not self-report as being Black.

[10] Alternatively one can also include year dummies, however to avoid multicollinearity with treatment period dummies we prefer the time trend. The results do not change when year dummies are used.

7 Results

In all the regression tables in this section and also in the appendix, EEA denotes the period after the Employment Equity Act was adopted. It is a binary variable and equals 1 in the period of 1999-2015, and 0 in the pre-treatment period, 1994-1998. Similarly, BEE03 denotes the period after the onset of BEE in 2003. It equals 1 from 2004-2015 and 0 from 1994-2003. BEE07 denotes the period after which Codes of Good Practice became effective, therefore it equals 1 in the period from 2007-2015 and 0 in the period of 1994-2006. Female is a binary variable that equals 1 for females and 0 for males. Black is also a binary variable that is coded as 1 if an individual belongs to African, Coloured or Indian/Asian population group, it equals 0 if an individual belongs to White population group. Since EEA and BEE03 turn 1 and remain 1 till then end of the study period, 2015, the coefficients of BEE07 can be interpreted as the cumulative effect of all three stages.

The dependant variable in all regressions is binary and equals 1 if an individual is employed in a top occupation and 0 otherwise. All the regressions are estimated using linear probability model and heteroscedasticity robust standard errors. In addition, all regressions include individual-specific observable covariates such as marital status, education level and age. Plus, we include a time trend to control for the macroeconomic changes that affect everyone, and province fixed effects to control for the province-specific time-invariant heterogeneity.

In Table 4 we include each policy episode in a regression analysis one after another. Thus, in column 1 we include only the dummy variable for EEA and its interaction with Female and Black. However, in this case the impact on Black women is not clearly identified since both White and Black women are included in the EEA. Black males are still included as a comparison group since they were also beneficiaries of EEA but for the top occupations we consider them as indirect beneficiaries. The coefficient on the triple interaction between EEA, Female and Black shows that there is a positive correlation between the EEA and the probability of Black female employment in top occupations for the whole period compared to the period before EEA. In contrast, white females and Black males did not seem to benefit. In column 2, we add the BEE03 and the relevant interaction terms. In terms of BEE03 we have two control groups, White females that were not beneficiaries of BEE03 and Black males that benefited from BEE03 but in the context of male-dominated top level occupations the treatment intensity for them should be lower. The triple interaction term of BEE03, Female and Black (BEE03*Female*Black) shows that the situation of Black Females remained stable compared to the period before the 2003. In column 3, which is our main specification, we include the interaction effects of BEE07, the onset of Codes of Good

Practice, which established specific targets for employment of Black females in top occupations. The coefficient of the triple interaction term with BEE07 (BEE07*Black*Female) is negative and statistically significant at the five percent level. This is a rather unexpected effect, which indicates that the probability of Black female employment in top occupations decreased by 3 percent in the period of BEE07 compared to the pre-BEE07 period. At the same time, we now find that Black women were significantly benefitting from the BEE03 which lead to a 2.2% higher likelihood of being employed in the top occupations. But this effect then was counteracted by the negative effect of BEE07, leaving no net effect after 2007.[11]

This negative effect after 2007 could be an indication that the push for Black females led to the opposite effects, where White women and Black men were favoured compared to the Black women as in the case of India (Bertrand et al., 2010). The positive coefficient for White females after BEE07 (BEE07*Female) and the no more negative and statistically significant effect for Black males (BEE07*Black) indicates that this is most likely what is happening.

On the other hand, one can argue that the effectiveness of affirmative action policy highly depends on its design. Leonard (1985b; 1990) finds that goals work better than quotas. This might be relevant especially in the context of South African development strategy that follows a market-oriented path. As Tangri and Southall (2008) argue African National Congress has been trying to achieve two contradicting goals at the same time, a *populist* goal on Black empowerment with a *capitalist-led* economic growth. Hence, in the context of SA it seems counterproductive to set specific targets (similar to quotas) and directly intervene in firms hiring decisions when the capital is heavily owned and dominated by minority Whites.[12]

In addition, the year 1999 marks the start of the longest business cycle upswing in South Africa whereas after 2003 the economic growth became more stable up until the financial crises, 2010-2011, (Burger et al., 2016). Thus, another explanation is that affirmative action is effective when the economy is growing and did not have much of an effect when the economy was slowing and labour demand was stagnant.

Lastly, it may be the case that the gender aspects of affirmative action were never taken very seriously, compared with the greater concern for racial equality. But our results suggest that Black males did not benefit much either in terms of better access to top jobs as a result of any of the three policies. This suggests that the policy was more generally ineffective.

[11] It is not uncommon in the affirmative action literature to find no or very small effects for quotas, for example due to weak enforcement (Leonard 1990) or sorting effects (Oyer and Schaefer, 2002).

[12] One can also observe that the coefficients of EEA and BEE03 are positive and statistically significant in the regressions. This is due to the fact that the year 1999 coincides with the longest business cycle upswings in South Africa and after 2003 the economic growth became more robust in the country (Burger et al., 2016).

Table 4 – Effects of EEA, BEE03 and BEE07 on (Black) female employment in top occupations, LPM

	(1) EEA	(2) BEE03	(3) BEE07
EEA	0.033***	0.018***	0.017***
	(0.005)	(0.007)	(0.007)
EEA*Female	-0.009	-0.011	-0.011
	(0.007)	(0.008)	(0.008)
EEA*Black	-0.051***	-0.034***	-0.034***
	(0.005)	(0.007)	(0.007)
EEA*Female*Black	0.013*	0.013	0.013
	(0.007)	(0.009)	(0.009)
BEE03		0.018***	0.021**
		(0.007)	(0.009)
BEE03*Female		0.002	-0.016
		(0.009)	(0.012)
BEE03*Black		-0.026***	-0.031***
		(0.007)	(0.009)
BEE03*Female*Black		0.000	0.022*
		(0.009)	(0.012)
BEE07			-0.005
			(0.009)
BEE07*Black			0.006
			(0.009)
BEE07*Female			0.024**
			(0.012)
BEE07*Black*Female			-0.030**
			(0.012)
Female	-0.114***	-0.114***	-0.114***
	(0.005)	(0.005)	(0.005)
Black	-0.126***	-0.126***	-0.126***
	(0.004)	(0.004)	(0.004)
Female*Black	0.094***	0.093***	0.093***
	(0.005)	(0.005)	(0.005)
Age	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)
Married or living together	0.016***	0.016***	0.016***
	(0.001)	(0.001)	(0.001)
Widow/widower	0.006***	0.006***	0.006***
	(0.001)	(0.001)	(0.001)
Divorced or separated	0.011***	0.011***	0.011***
	(0.002)	(0.002)	(0.002)
Less than primary	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)
Completed Primary	0.003***	0.003***	0.003***
	(0.001)	(0.001)	(0.001)
Completed Middle	0.025***	0.026***	0.026***
	(0.001)	(0.001)	(0.001)
Completed Senior	0.059***	0.059***	0.059***
	(0.002)	(0.002)	(0.002)
Completed College	0.109***	0.109***	0.109***
	(0.003)	(0.003)	(0.003)
Postgrad	0.143***	0.144***	0.144***
	(0.006)	(0.006)	(0.006)
Completed Postgrad	0.190***	0.187***	0.186***
	(0.016)	(0.016)	(0.016)
Time trend	0.001***	0.001***	0.002***
	(0.000)	(0.000)	(0.000)
Constant	0.087***	0.086***	0.086***
	(0.005)	(0.005)	(0.005)
Province-FE	Yes	Yes	Yes
R2	0.088	0.089	0.089
Observations	375921	375921	375921
Years	21	21	21

Standard errors calculated based on robust variance estimates.
Significance levels: *p<0.10; **p<0.05; ***p<0.01.

In the following regression tables we further test for the robustness of the results in column 3 of Table 4.[13] The affirmative action policy applies only to employers with more than 50 employees and to those with formal employment. Therefore, in Table 5 we run subsample analysis for employers with more, and less than 50 employees, and for formal and informal employments. We code an employment informal if the respondent had no written contract with his or her employer. Hence, if our regression equation is well identified then we should not expect to see affirmative action effects (as in Table 4, column 3) for informal occupations and for employers with less than 50 employees. Since this information is available only in LFS and QLFS surveys, the period before the EEA (1994-1999) is not included in the analysis.

Column 1 of Table 5 can be regarded as a better identified sample as it includes only the sample of employers with more than 50 employees. In result, we observe that the direction of the treatment effect is similar to that of in column 3 of Table 4, however in this case they are larger and statistically significant at the one percent level. The coefficient of the triple interaction term of BEE03 shows that the BEE in 2003 increased the likelihood of Black female employment in top occupations by 2.3 percent compared to the period before 2000-2003. However, the push for specific targets in 2007 decreased the probability of Black female employment in top occupations by almost 7 percent compared to the period before, 2000-2006. Both effects are statistically significant at the one percent level. As expected in column 2 and column 3, we do not observe any statistically significant effects for the treatment effect (triple interaction terms) for small firms and informal employment, which indicates that our identification is credible and shows that our effects come from employers covered by the policies. In column 4, we run subsample analysis for only formal occupations and observe similar effects as in column 1.

In Table 6, column 1 we further check for the correct identification of our strategy where we use "placebo" years for the EEA, BEE03 and BEE07 by setting the treatment years to 1996, 2001 and 2005 before the actual policy episodes took place. We thus expect no statistically significant treatment effects when using placebo periods. Indeed, the treatment effect of BEE03 and BEE07 (triple interaction term) is not statistically significant at the conventional levels.[14] In column 2 of Table 6, we check for the lagged effects of the affirmative action as it might take some time to materialize. In this case we set treatment years to one year after the treatment (2000, 2005, 2008). In result, the direction of the treatment effects do not change, however statistically they are weaker.

[13] However, in contrast to Table 4 we do not include a triple interaction of EEA (EEA*Female*Black) as in this case White women are not a control group anymore. Also, the results do not change when we regard Africans as the treatment group instead of Blacks – African, Coloured and Indian/Asians.

Table 5 – Treatment effects by employer size, formal vs. informal employment, LPM

	(1) More than 50	(2) Less than 50	(3) Informal (No contract)	(4) Formal (Contract!)
BEE03	0.044***	0.018	0.022	0.035***
	(0.014)	(0.014)	(0.029)	(0.010)
Female	-0.097***	-0.144***	-0.121***	-0.123***
	(0.011)	(0.010)	(0.017)	(0.008)
BEE03*Female	-0.046**	0.004	-0.007	-0.019
	(0.019)	(0.016)	(0.035)	(0.013)
Black	-0.119***	-0.178***	-0.159***	-0.145***
	(0.008)	(0.009)	(0.015)	(0.007)
BEE03*Black	-0.053***	-0.019	-0.027	-0.039***
	(0.014)	(0.014)	(0.029)	(0.011)
Female*Black	0.074***	0.130***	0.109***	0.101***
	(0.012)	(0.010)	(0.017)	(0.008)
BEE03*Female*Black	0.059***	-0.001	0.013	0.028**
	(0.020)	(0.017)	(0.035)	(0.013)
BEE07	-0.025*	0.023*	-0.024	-0.003
	(0.013)	(0.013)	(0.035)	(0.010)
BEE07*Female	0.052***	-0.002	0.021	0.027**
	(0.019)	(0.015)	(0.042)	(0.012)
BEE07*Black	0.030**	-0.018	0.024	0.008
	(0.013)	(0.013)	(0.035)	(0.010)
BEE07*Female*Black	-0.059***	-0.003	-0.020	-0.033***
	(0.019)	(0.016)	(0.042)	(0.012)
Time trend	0.001**	0.000**	0.000	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.041***	0.147***	0.155***	0.086***
	(0.010)	(0.010)	(0.015)	(0.008)
Province-FE	Yes	Yes	Yes	Yes
R2	0.117	0.090	0.073	0.093
Observations	87008	172289	73052	190244
Controls	Yes	Yes	Yes	Yes
Years	15	15	15	15

Controls: Age; Marital Status; Education level. Standard errors calculated based on robust variance estimates.
Significance levels: *p<0.10; **p<0.05; ***p<0.01.

Noteworthy is that now we find a small significant positive effect of the EEA policy on employment probabilities of women, which is evidence that the policy might have had a delayed positive, but small, impact.

In Table A2, in the appendix, we include group-year interaction effects to control for group specific time trends. The results show that the effects of BEE03*Female*Black and BEE07*Female*Black are robust, however, they last only up to 3 years after BEE03 and two years after BEE07. The statistically significant effects driven by the Black Economic Empowerment diminish after 2010 while group-specific year fixed effects for Blacks remain negative and

statistically significant at the one percent level while year fixed effects remain positive and statistically significant at the one percent level throughout the period, with the largest effect in 2008.

Table 6 – Placebo years and lagged effects, LPM

	(1) Placebo	(2) Lagged
EEA	0.017***	-0.020***
	(0.002)	(0.002)
Female	-0.114***	-0.121***
	(0.004)	(0.004)
EEA*Female	-0.009***	0.003**
	(0.002)	(0.002)
BEE03	0.020***	0.020**
	(0.007)	(0.009)
BEE03*Female	-0.004	-0.012
	(0.009)	(0.011)
Black	-0.138***	-0.144***
	(0.004)	(0.003)
BEE03*Black	-0.033***	-0.031***
	(0.007)	(0.009)
Female*Black	0.099***	0.100***
	(0.005)	(0.004)
BEE03*Female*Black	0.013	0.018*
	(0.009)	(0.011)
BEE07	0.020***	0.011
	(0.008)	(0.010)
BEE07*Female	0.009	0.014
	(0.010)	(0.012)
BEE07*Black	-0.014*	-0.014
	(0.008)	(0.010)
BEE07*Female*Black	-0.011	-0.020*
	(0.010)	(0.012)
Time trend	-0.000	0.002***
	(0.000)	(0.000)
Constant	0.088***	0.099***
	(0.004)	(0.004)
Province-FE	Yes	Yes
R2	0.089	0.089
Observations	375921	375921
Controls	Yes	Yes
Years	21	21

Controls: Age, Marital Status, Years of education. Placebo years are 1996; 2001; 2005, two years before the operationalization of each phase. Lagged effects: The treatment is assigned to 1 year after the operationalization (2000, 2005, 2008). Standard errors calculated based on robust variance estimates. Significance levels: *p<0.10; **p<0.05; ***p<0.01.

In Table 7, we check for the heterogeneity of treatment effects based on educational level of individuals as well as we look at only female and only Black samples. Column 1 includes individuals with 11 or more years of schooling equivalent to Junior High level, and column 2 includes individuals with 10 or less years of schooling.[15] In terms of employment in top occupational categories we expect stronger effects for the more educated sample compared to the less educated one. The results on the triple interaction with BEE03 and BEE07 confirm our expectations.

In columns 3 of Table 7 we restrict our sample to Females only and compare the treatment effects of BEE03 and BEE07 for Black females having White females as the only control group. We find some evidence of a positive effect of EEA, but we do not find statistically significant effects for the BEE03 treatment for Black females. As before, we observe that the probability of Black female employment in top occupations decreased after 2007, statistically significant at the one percent level. When looking at the Black sample only and having Black males as the only control group in column 4, we observe positive treatment effects for Black females after 2003 but negative effects after 2007, statistically significant at the one percent level. The size of the effect is much smaller when only Black sample is taken.[16]

The surprisingly negative effect for Black females in the aftermath of the third policy episode can be explained by analysing the effects for Black men. Column 1 of Table 5, shows DDD estimation results for those employers that are the designated compliers (i.e. large firms with more than 50 employees). The results show that the effects for Black men compared to Black women () go in opposite directions. In particular, after 2003 Black men (BEE03*Black) reduced their share in top occupations while Black women (BEE03*Female*Black) increased their shares in this occupational category. After 2007, the situation reverses, Black men (BEE07*Black) are more likely to be employed in top occupations in contrast to Black females (BEE07*Female*Black). Both results are statistically significant at least at the five percent level. That implies that employers see Black men and women as substitutes for complying with Black Economic Empowerment. It is likely that despite the special focus on Black female empowerment after 2007 based on Codes of Good Conduct and Generic Scorecards, firms seem to opt to achieve points by empowering a few Blacks instead of having many Black females in top management positions. For example, after 2007 the firm can get the high enough points through Ownership element. With only Ownership and Skills Development elements the firm can achieve an average compliance rating and would not need to comply with the Management element.

[15] We decided on the 10 years schooling cut-off in order to have samples of comparable sized.

Table A1, in the appendix, further analyses the heterogeneous treatment effects for different industries. The results show that treatment effects of BEE03 and BEE07 are observed namely in two industries: Mining and Quarrying, and Service.

Table 7 – Treatment effects by education level and subpopulation analysis, LPM

	(1) Junior High	(2) Less than Junior High	(3) Females only	(4) Blacks only
EEA	-0.004	-0.015***	0.011**	-0.013***
	(0.004)	(0.001)	(0.005)	(0.001)
Female	-0.139***	-0.031***		-0.020***
	(0.005)	(0.008)		(0.001)
EEA*Female	0.001	0.002		0.002
	(0.004)	(0.002)		(0.002)
BEE03	0.032***	-0.003	0.006	-0.007***
	(0.010)	(0.014)	(0.007)	(0.001)
BEE03*Female	-0.023*	-0.001		0.007***
	(0.012)	(0.021)		(0.002)
Black	-0.148***	-0.077***	-0.043***	
	(0.004)	(0.006)	(0.003)	
BEE03*Black	-0.053***	-0.004	-0.007	
	(0.010)	(0.014)	(0.007)	
Female*Black	0.102***	0.023***		
	(0.005)	(0.008)		
BEE03*Female*Black	0.040***	0.004		
	(0.012)	(0.021)		
BEE07	-0.006	0.009	0.023***	0.005***
	(0.010)	(0.016)	(0.007)	(0.001)
BEE07*Female	0.031**	0.003		-0.006***
	(0.013)	(0.024)		(0.002)
BEE07*Black	0.006	-0.010	-0.025***	
	(0.011)	(0.016)	(0.007)	
BEE07*Female*Black	-0.036***	-0.003		
	(0.013)	(0.025)		
Time trend	0.002***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
EEA*Black			-0.023***	
			(0.005)	
Constant	0.098***	0.080***	0.029***	-0.028***
	(0.005)	(0.006)	(0.004)	(0.002)
Province-FE	Yes	Yes	Yes	Yes
R2	0.075	0.020	0.048	0.036
Observations	184508	191413	168377	326756
Controls	Yes	Yes	Yes	Yes
Years	21	21	21	21

Controls: Age; Marital Status; Education level. Standard errors calculated based on robust variance estimates.
Significance levels: *p<0.10; **p<0.05; ***p<0.01. Junior High denotes 10 years of schooling.

8 Conclusions and policy implications

In this paper we evaluate the impact of affirmative action policy on occupational segregation by gender in high-skilled jobs in South Africa. The policy in South Africa aims to increase the participation of disadvantaged groups (i.e. Black people and Black women, White women included only in the initial policy) in all occupational levels and, since 2007, it set targets for the promotion of Black female representation in top positions. Thus, we identify the treatment effect on Black women by subtracting the trend common for all Blacks and the trend common for all women using White women and Black males as control groups. We estimate the treatment effect using difference-in-difference-in-difference estimation with a linear probability model.

Our main findings show that the Employment Equity Act of 1998 had a small delayed impact, while the Black Economic Empowerment policy in 2003 had positive effects on Black female employment in high-skill occupations whilst the targets set to benefit them in 2007 had actually the adverse effect. Several policy implications and conclusions may follow from these findings.

First, the design of the affirmative action matters, and its effectiveness might differ depending on the economic system of a country. South Africa is an interesting case here as its economic growth is promoted with market-oriented policies, with little state intervention in private sector. However, with the last episode of Black Economic Empowerment, the Codes of Good Practice, the state set specific targets for the private sector. This could have led to adverse effects in result of which employers started to hire more Black males and White females. Thus, in an economy where state intervention in private sector is set to be small, affirmative action policies should promote the firms to set goals for themselves rather than imposing targets and quotas set by the state. Accordingly, Leonard (1984b) shows that goals set by the firms are the best predictors of its employment demographics in the subsequent period.

Second, as Balshaw and Goldberg (2008) stress, many employers may have difficulties to meet these targets, in parts, due to lack of qualified candidates (p.119). This implies that affirmative action for employment is only one aspect of reducing segregation; the barriers in access to education should be addressed equally.

Third, there are issues of weak enforcement from the government side and weak management from the enterprise side. Balshaw and Goldberg, 2008 (p. 121) argue that EEA and BEE both in action, enterprises are expected to manage two legislations at the same time, where non-compliance with EEA might lead to R1 million fines and indirect penalization of BEE due to insufficient scorecard point leading to barriers in obtaining and sustaining a business while there are no sanctions for non-compliance of B-BEE. In addition, with new Generic Scorecards after 2007,

firms can become above-average contributors based on selective compliance on various empowerment elements.

Fourth, South African labour market is characterized by very high unemployment rates and low growth leading to low labour demand, thereby limiting the scope for affirmative action policies. Specifically after 2007, the financial crises, and in the recent decade the lower growth rates of mining sector have further decreased the demand for labour. This may have hit the Black females in top managerial occupations the hardest as the positive effects for Black female employment before the 2007 were driven by the mining sector.

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Appendix

Table A1- Sectoral effects

	(1) Mining and quarrying	(2) Manufac-turing	(3) Utilities	(4) Construction	(5) Trade	(6) Transport	(7) Finance	(8) Service
EEA	-0.044***	-0.016***	0.012	0.010**	-0.024***	-0.015**	-0.009	-0.006
	(0.006)	(0.005)	(0.018)	(0.004)	(0.006)	(0.007)	(0.008)	(0.004)
BEE03	-0.003	0.015	-0.070	0.020	0.062***	-0.008	0.035	0.030**
	(0.022)	(0.019)	(0.046)	(0.038)	(0.022)	(0.026)	(0.025)	(0.015)
BEE07	-0.031	-0.010	0.016	0.025	-0.012	0.046	-0.040	-0.019
	(0.023)	(0.021)	(0.051)	(0.039)	(0.024)	(0.029)	(0.025)	(0.016)
Female	-0.065***	-0.134***	-0.040	-0.068**	-0.121***	-0.051***	-0.136***	-0.067***
	(0.018)	(0.012)	(0.034)	(0.030)	(0.013)	(0.015)	(0.012)	(0.006)
EEA*Female	0.035**	0.001	0.019	0.001	0.006	0.018	0.003	-0.003
	(0.014)	(0.005)	(0.031)	(0.015)	(0.006)	(0.014)	(0.010)	(0.004)
BEE03*Female	-0.063*	-0.021	0.046	-0.046	-0.021	0.005	-0.007	-0.022
	(0.036)	(0.028)	(0.094)	(0.064)	(0.030)	(0.046)	(0.029)	(0.016)
Black	-0.055***	-0.157***	-0.093***	-0.124***	-0.183***	-0.075***	-0.148***	-0.049***
	(0.008)	(0.008)	(0.019)	(0.016)	(0.010)	(0.010)	(0.010)	(0.006)
BEE03*Black	-0.013	-0.034*	0.043	-0.022	-0.072***	-0.019	-0.053**	-0.033**
	(0.021)	(0.019)	(0.045)	(0.038)	(0.022)	(0.025)	(0.025)	(0.015)
Female*Black	0.015	0.116***	0.009	0.063**	0.100***	0.030*	0.118***	0.040***
	(0.017)	(0.012)	(0.039)	(0.032)	(0.013)	(0.017)	(0.012)	(0.006)
BEE03*Female*Black	0.102**	0.031	-0.047	0.059	0.025	0.006	0.018	0.030*
	(0.040)	(0.028)	(0.093)	(0.063)	(0.030)	(0.047)	(0.029)	(0.017)
BEE07*Female	0.139***	0.048	-0.070	0.007	0.010	-0.023	0.054*	0.029
	(0.044)	(0.031)	(0.098)	(0.063)	(0.032)	(0.050)	(0.030)	(0.018)
BEE07*Black	0.011	0.000	-0.035	-0.020	0.011	-0.056*	0.038	0.036**
	(0.023)	(0.021)	(0.051)	(0.040)	(0.024)	(0.029)	(0.025)	(0.017)
BEE07*Female*Black	-0.166***	-0.049	0.066	-0.020	-0.017	0.014	-0.048	-0.046**
	(0.048)	(0.032)	(0.102)	(0.064)	(0.032)	(0.052)	(0.031)	(0.019)
Time trend	0.003***	0.002***	0.002	-0.000	0.002***	0.003***	0.002**	0.001*
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
Constant	0.021*	0.084***	-0.018	0.082***	0.127***	-0.012	0.030*	0.001
	(0.012)	(0.010)	(0.031)	(0.017)	(0.013)	(0.016)	(0.016)	(0.007)
Province-FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.079	0.143	0.111	0.127	0.115	0.098	0.108	0.039
Observations	18374	51329	3597	21923	57606	18409	32672	92898
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Years	21	21	21	21	21	21	21	21

Controls: Age, Marital Status, Education Level. Standard errors calculated based on robust variance estimates. Significance levels: *p<0.10; **p<0.05; ***p<0.01.

Table A2 – Group and time trends

	(1)
Female	-0.100***
	(0.008)
Black	-0.109***
	(0.006)
Female*Black	0.080***
	(0.008)
1995	-0.003
	(0.010)
1996	0.032**
	(0.015)
1997	0.068***
	(0.013)
1998	0.111***
	(0.015)
1999	0.085***
	(0.013)
2001	0.036***
	(0.013)
2002	0.044***
	(0.013)
2003	0.053***
	(0.013)
2004	0.082***
	(0.014)
2005	0.069***
	(0.015)
2006	0.080***
	(0.016)
2007	0.039***
	(0.015)
2008	0.103***
	(0.015)
2009	0.085***
	(0.016)
2011	0.085***
	(0.016)
2012	0.057***
	(0.015)
2013	0.089***
	(0.016)
2014	0.091***
	(0.016)
2015	0.092***
	(0.018)

Female*1995	-0.011
	(0.012)
Female*1996	0.002
	(0.020)
Female*1997	-0.012
	(0.017)
Female*1998	-0.085***
	(0.019)
Female*1999	-0.032*
	(0.018)
Female*2001	-0.031*
	(0.016)
Female*2002	-0.015
	(0.017)
Female*2003	-0.018
	(0.017)
Female*2004	-0.049***
	(0.018)
Female*2005	-0.030*
	(0.018)
Female*2006	-0.039**
	(0.020)
Female*2007	-0.018
	(0.019)
Female*2008	-0.046**
	(0.019)
Female*2009	-0.033
	(0.020)
Female*2011	-0.007
	(0.021)
Female*2012	-0.001
	(0.019)
Female*2013	-0.025
	(0.021)
Female*2014	0.017
	(0.022)
Female*2015	-0.005
	(0.024)
Black*1995	0.001
	(0.010)
Black*1996	-0.028*
	(0.015)
Black*1997	-0.046***
	(0.013)
Black*1998	-0.084***
	(0.016)
Black*1999	-0.075***
	(0.014)

Black*2001	-0.042***
	(0.013)
Black*2002	-0.043***
	(0.013)
Black*2003	-0.051***
	(0.013)
Black*2004	-0.085***
	(0.014)
Black*2005	-0.074***
	(0.015)
Black*2006	-0.083***
	(0.016)
Black*2007	-0.037**
	(0.015)
Black*2008	-0.097***
	(0.016)
Black*2009	-0.082***
	(0.016)
Black*2011	-0.077***
	(0.016)
Black*2012	-0.051***
	(0.015)
Black*2013	-0.082***
	(0.016)
Black*2014	-0.081***
	(0.017)
Black*2015	-0.088***
	(0.018)
Female*Black*1995	0.016
	(0.012)
Female*Black*1996	0.006
	(0.020)
Female*Black*1997	0.006
	(0.017)
Female*Black*1998	0.074***
	(0.019)
Female*Black*1999	0.029
	(0.018)
Female*Black*2001	0.036**
	(0.016)
Female*Black*2002	0.015
	(0.017)
Female*Black*2003	0.021
	(0.017)
Female*Black*2004	0.057***
	(0.018)
Female*Black*2005	0.042**
	(0.019)

Female*Black*2006	0.048**
	(0.020)
Female*Black*2007	0.027
	(0.019)
Female*Black*2008	0.049**
	(0.020)
Female*Black*2009	0.039*
	(0.020)
Female*Black*2011	0.009
	(0.021)
Female*Black*2012	0.006
	(0.020)
Female*Black*2013	0.027
	(0.021)
Female*Black*2014	-0.019
	(0.022)
Female*Black*2015	0.007
	(0.024)
Constant	0.065***
	(0.007)
Province-FE	Yes
R2	0.091
Observations	375921
Controls	Yes
Years	21

Controls: Age, Marital Status, Education level. Standard errors calculated based on robust variance estimates. Significance levels: *p<0.10; **p<0.05; ***p<0.01.