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DID THE END OF APARTHEID SPELL THE BEGINNING OF THE END FOR THE RACIAL WAGE HIERARCHY IN SOUTH AFRICA? A MULTILATERAL ANALYSIS OF RACIAL WAGE DIFFERENTIALS IN THE EARLY POST-APARTHEID PERIOD

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ABSTRACT

The South African apartheid system formally ended with the election of the African National Congress at the first all-race elections held in 1994. As a result, racist policies such as color barring, that particularly hindered the advancement of black workers throughout the apartheid period are no longer legal. Yet the legacy of apartheid may endure as a result of both the persistence of racial differences in human capital attributes and the possible continuation of discriminatory practices within employment. In this paper we examine the evolution of the racial wage hierarchy in the early post-apartheid era against the background of the long-term decline in racial wage disparities observed over the latter years of the apartheid regime. We find evidence that the position of black workers between 1995 and 1997 actually deteriorated relative to the overall geometric mean wage, while that of colored, asian and white workers improved.

JEL Codes: J71, J31

1. Introduction

The South African apartheid system formally ended with the election of the African National Congress at the first all-race elections held in 1994. These elections concluded 46 years of official racial discrimination and inequality that had its roots in social structures, practices and attitudes dating back to the early nineteenth century. Despite the political transformation that has occurred and the elimination of overtly discriminatory laws and regulations, 'the overall consequences of the legacy of apartheid are deeply embedded in the polity, society and economy of the country' (Presidential Commission, 1996) potentially undermining the aspirations of the new South African democracy, at least within a reasonable time-frame.

Discrimination in the labor market was at the heart of the apartheid system, resulting in the use of non-productivity-related criteria in decisions concerning the allocation and utilization of labor such as in recruitment, remuneration, firing and retrenchment (Presidential Commission, 1996). Apartheid policies adopted by the white-dominated National Party government such as color barring and job reservation, for example through the *Industrial Conciliation Act 1956*, constituted statutory forms of racial discrimination and have now been repealed. Labor market outcomes were also conditioned by various institutional barriers to labor mobility and through the differential provision of and access to education, training and social welfare. These forms of pre-labor market discrimination have also been subject to fundamental reform with, for example, the repeal of the *Bantu Urban Areas Act 1945* and the *Bantu Education Act 1955*.

However the repeal of apartheid legislation is unlikely to be sufficient to eradicate the established racial wage hierarchy. On this issue, USA and other international experience offers some relevant insights even though it tends to concern discrimination against a minority, rather than the majority as is the case in South Africa. In particular, Darity and Mason (1998) and Altonji and Blank (1999) review a large literature on the USA labor market which provides evidence that the signal *Civil Rights Act* of 1964 led to a sustained and significant decline in

black/white earnings differentials over the following decade (Donahue and Heckman, 1991), but that substantial racial disparities remained which have proved remarkably persistent over time. Arrow (1998) stresses the potential importance of non-taste-based 'statistical discrimination' and of social interactions and networks in influencing behavior and perpetuating differential treatment in the USA. Moreover, it is clear that past pre-labor market discrimination, particularly in the provision of education, can contribute markedly to continuing inequalities in the labor market since disadvantage tends to be self-reproducing and reinforcing. Case and Deaton (1998) have found that in South Africa those with poor education are often unable to secure sufficient income to provide for the education of their children.

It is in this context that this paper investigates racial wage differentials, discrimination and disadvantage in the South African labor market. The objective of the paper is to employ a robust multilateral decomposition procedure to examine differences in racial wage differentials between 1995 and 1997, and to view such differences from a longer, historical perspective by drawing a comparison with the level of racial disadvantage and discrimination observed in 1980. Knight and McGrath (1987), Moll (1995) and Treiman et al. (1996) have all investigated changing levels of wage discrimination in South Africa but these studies have been based on methodologies producing only binary comparisons of the wage position of whites with that of one or more of the non-white groups. Our analysis includes more recent evidence and the adoption of a multilateral decomposition procedure permits the joint decomposition of the wage differentials of two or more groups into productivity and discrimination components. Thus, the approach more readily allows an investigation of the changing basis of the racial wage hierarchy within South Africa and of the relative positions of blacks, coloreds, asians and whites in the post-apartheid era.

The structure of the working paper is as follows. Section 2 outlines the methodology which is used to estimate wage discrimination. Sections 3 and 4 respectively gives details of the

main wage function and decomposition analyses based on hourly wage rate data for 1995 and 1997. Section 5 gives details of the supplementary analysis based on monthly earnings data for 1980, 1995 and 1997. Conclusions are drawn in Section 6.

2. Methodological Framework

This section presents a multilateral procedure that facilitates investigation of the changing basis of the racial wage hierarchy within South Africa by providing a joint decomposition of the logarithmic wage differentials between black, colored, asian and white groups. Like other decomposition techniques our methodology measures discrimination indirectly as the residual component from an estimated wage function. Inevitably, errors in the specification of the wage determination model will lead to inaccurate estimates of discrimination. In addition, the results are sensitive to the specification and estimation of the non-discriminatory wage structure. However, data problems preclude a more direct approach to the measurement of racial wage discrimination in South Africa.

Following Oaxaca and Ransom (1994) the difference in the mean of the natural logarithm of wages for groups j and k in period t can be decomposed into an explained component which captures productivity differences between workers, and an unexplained component which includes racial wage discrimination:

$$ln(G_{jkt}+1) = ln(Q_{jkt}+1) + ln(D_{jkt}+1); \quad j,k = black, colored, asian, white \tag{1}$$

where: G_{jkt} is the gross (unadjusted) wage differential defined as $((W_{jt}/W_{kt})-1)$ where W_{jt} is the geometric mean wage of group j and W_{kt} is the corresponding wage of group k; Q_{jkt} is the productivity differential $((W_{jt}^*/W_{kt}^*)-1)$ where W_{jt}^* and W_{kt}^* denote the geometric mean wage rates of each group in the absence of labor market discrimination; and D_{jkt} is identified as the

market discrimination coefficient $((W_{jt}/W_{kt})-(W_{jt}^{*}/W_{kt}^{*}))/(W_{jt}^{*}/W_{kt}^{*})$, that is the proportionate difference between $(G_{jkt}+1)$ and $(Q_{jkt}+1)$.

Oaxaca (1973) and Blinder (1973) show that the discrimination term can be decomposed in terms of the wage that each group receives relative to that which it would receive in the absence of discrimination. In Allanson et al. (2000), we further partition both the logarithmic gross wage differential and the productivity component, to yield complementary measures of the geometric mean wage that each racial group receives relative to that of the workforce as a whole under both the (observed) discriminatory and (hypothetical) non-discriminatory wage structures. Thus (1) can be expanded to:

$$\{ln(\gamma_{jt}+1)-ln(\gamma_{kt}+1)\}=\{ln(\theta_{jt}+1)-ln(\theta_{kt}+1)\}+\{ln(\delta_{jt}+1)-ln(\delta_{kt}+1)\} \qquad (2)$$

where γ_{jt} is the differential between the geometric mean wage of group j and that of the entire workforce $((W_{jt}/W_{t})-1)$, where W_{t} is the overall geometric mean wage; θ_{jt} is the differential between the geometric mean wage of group j and that of the entire workforce in the absence of discrimination $((W_{jt}^{*}/W_{t}^{*})-1)$; δ_{jt} is the differential between the geometric mean wage of group j and the wage that workers of group j would receive in the absence of discrimination $((W_{jt}/W_{jt}^{*})-1)$; and γ_{kt}, θ_{kt} and δ_{kt} are similarly defined for group k. The main advantage of (2) over the standard Oaxaca-Blinder decomposition equation is that each component of the decomposition equation is expressed as the difference between two terms that are defined independently of the particular binary comparison that is being made. The complete set of γ, δ and θ coefficients constitute a set of sufficient statistics for the multilateral analysis of the racial wage hierarchy.

If the data on wages consist solely of point observations, the decomposition equation (2) may be operationalised by using ordinary least squares (OLS) to estimate separate semi-logarithmic wage functions:

$$ln\,W_{git} = X'_{git}\beta_{it} + u_{git}; \quad g=1,...n_{it};$$ (3)

for each racial group i $(i=$ black, colored, asian, white$)$ using cross-sectional data for period t, where $ln\,W_{git}$ is the logarithmic wage of worker g in group i, X_{git} is a vector of worker characteristics, β_{it} is a vector of group-specific coefficients and n_{it} is the sample size. A similar function for the workforce as a whole may be estimated using the pooled sample of size n_t:

$$ln\,W_{ht} = X'_{ht}\beta_t + u_{ht}; \quad h=1,...\,n_t; \quad n_t = \Sigma\,n_{it};$$ (4)

where $ln\,W_{ht}$ is the logarithmic wage of worker h, X_{ht} is a vector of worker characteristics and β_t is a vector of coefficients. Given some estimate of the non-discriminatory wage structure $\widetilde{\beta}_t^*$ in year t, estimates of the decomposition terms in equation (2) can then be derived as:

$$ln\{\,\widetilde{\gamma_{it}} + 1\,) = ln\,\widetilde{W}_{it} - ln\,\widetilde{W}_t = \overline{X}'_{it}\widetilde{\beta}_{it} - \overline{X}'_t\widetilde{\beta}_t; \quad \forall i$$ (5)

$$ln\{\,\widetilde{\theta_{it}} + 1\,) = ln\,\widetilde{W}_{it}^* - ln\,\widetilde{W}_t^* = (\,\overline{X}_{it} - \overline{X}_t\,)'\widetilde{\beta}_t^*; \quad \forall i$$ (6)

$$ln\{\,\widetilde{\delta_{it}} + 1\,) = ln\,\widetilde{W}_{it} - ln\,\widetilde{W}_{it}^* = \overline{X}'_{it}(\,\widetilde{\beta}_{it} - \widetilde{\beta}_t^*\,); \quad \forall i$$ (7)

where $\overline{X}_{it}$ is the vector of mean values of the regressors for group i, $\overline{X}_t$ is the corresponding mean vector for the whole workforce, and tildes denote estimates. Hence, $\widetilde{\theta}_{it}$ may be

interpreted as the estimated wage differential between a typical worker in group i, with characteristics $\overline{X}_{it}$, and a typical worker in the entire workforce, with characteristics $\overline{X}_t$, under the hypothetical non-discriminatory wage structure in period t; and $\widetilde{\delta}_{it}$ as the estimated wage differential for a typical worker in group i between the discriminatory and non-discriminatory wage structures. Moreover, changes in the left hand side terms in (6) and (7) between any two periods $t=0$ and $t=1$ may be decomposed in the standard way (Altonji and Blank, 1999) to give:

$$ln\{\widetilde{\theta}_{i1}+1\}-ln\{\widetilde{\theta}_{i0}+1\}=((\overline{X}_{i1}-\overline{X}_1)'-(\overline{X}_{i0}-\overline{X}_0)')\widetilde{\beta}_0^* +(\overline{X}_{i1}-\overline{X}_1)'(\widetilde{\beta}_1^*-\widetilde{\beta}_0^*);\ \forall i \qquad (8)$$

$$ln\{\widetilde{\delta}_{i1}+1\}-ln\{\widetilde{\delta}_{i0}+1\}=\overline{X}_{i0}'((\widetilde{\beta}_{i1}-\widetilde{\beta}_1^*)-(\widetilde{\beta}_{i0}-\widetilde{\beta}_0^*))+(\overline{X}_{i1}'-\overline{X}_{i0}')(\widetilde{\beta}_{i1}-\widetilde{\beta}_1^*);\ \forall i \qquad (9)$$

where the first term on the right hand side (RHS) of (8) is the net change in the productivity term due to changes in worker characteristics given the non-discriminatory coefficient values in $t=0$ (i.e., the hypothetical returns to those characteristics in a non-discriminatory market in the base year), with the residual due to changes in non-discriminatory coefficients given worker characteristics in $t=1$; and the first term on the RHS of (9) is the net change in the discrimination term due to changes in coefficient values given worker characteristics in $t=0$, with the residual due to changes in worker characteristics given the coefficient values in $t=1$.

All that is now required is to obtain some estimate of the non-discriminatory wage structure $\widetilde{\beta}_t^*$. A convenient candidate is the pooled OLS estimator, which Neumark (1988) shows can be derived from a model of employer discrimination in which the utility function of the employer is homogeneous of degree zero within each category of labor, that is the employer only cares about the proportion of each group employed in any particular labor category. In the

multi-group case, application of this estimator yields:

$$\tilde{\beta}_t^* = \tilde{\beta}_t \ ; \tag{10}$$

where $\tilde{\beta}_t$ is the OLS estimator of β_t derived using the pooled sample in (4). Thus $\tilde{\beta}_t^*$ will depend on the characteristics of workers from all racial groups, though individual elements of $\tilde{\beta}_t$ need not be bracketed by the corresponding elements of $\tilde{\beta}_{it}$ from the separately estimated racial wage structures (Oaxaca and Ransom, 1994). Moreover, the overall geometric mean wage will be the same under the discriminatory and non-discriminatory wage structures, that is $ln\tilde{W}_t = ln\tilde{W}_t^*$, yielding an exact decomposition of the gross wage differential term given by $ln\{\tilde{\gamma}_{it} + 1) = ln\{\tilde{\theta}_{it} + 1) + ln\{\tilde{\delta}_{it} + 1)$. This makes the interpretation of the decomposition results particularly simple.

In practice, OLS estimation of (3) and (4) will be infeasible if some or all of the observations on wages take the form of interval data as will often be the case since surveys typically request only the earnings category into which the respondent falls. Estimation in these circumstances may be accomplished by use of a generalized Tobit estimator (StataCorp, 1997, Volume 1, p. 145) to deal with the censoring of the dependent variable. Letting $\tilde{\beta}_{it}$ and $\tilde{\beta}_t$ in (5)-(10) now denote the Tobit estimates of the wage function coefficients, such that $ln\tilde{W}_{it} = \bar{X}'_{it}\tilde{\beta}_{it}$ and $ln\tilde{W}_t = ln\tilde{W}_t^* = \bar{X}'_t\tilde{\beta}_t$, the decomposition analysis will go through as before. In particular, the decomposition of the gross wage differential term $ln\{\tilde{\gamma}_{it} + 1) = ln\{\tilde{\theta}_{it} + 1) + ln\{\tilde{\delta}_{it} + 1)$ will continue to hold exactly in the data. The generalized Tobit estimator yields identical results to the OLS estimator in the special case in which all observations on the dependent variable are point data.

3. Wage function analysis

The data for the main analysis are derived from the 1995 and 1997 October Household Surveys (OHSs). These surveys have been conducted annually by Statistics South Africa (formerly the Central Statistical Service) since 1993, though the 1993 survey is not comparable with the subsequent surveys since it excluded the former bantustan states of Transkei, Bophuthatswana, Venda and Ciskei (TBVC states). The 1994 OHS was the first household survey to cover the entire country with 30000 households surveyed in 1000 sampled Enumeration Areas (EAs) with 30 households sampled in each EA. We have previously used the data from this survey to analyze racial wage discrimination at the outset of the post-apartheid regime (Allanson et al., 2000). The 1995 and 1997 surveys have been the other two OHSs to be conducted with a sample size of 30,000 households, but in both cases these were selected from 3000 sampled EAs with ten households interviewed in each EA. The results based on these two surveys that we report in this paper are not consistent with our earlier work based on the 1994 OHS. We believe that the reason for this discrepancy may be that the sample for the 1994 OHS was less widely dispersed throughout the country and that the results based on the later surveys are therefore likely to be more reliable.

One of the main purposes of the OHS is to obtain indicators of the size of the economically active population in South Africa with special reference to the number of unemployed persons. Employees in all formal as well as informal business sectors are covered by the OHS since the survey is based on households, not businesses. Each annual OHS was conducted as an independent survey based on a different sample design: the sampling procedure involved stratification by province and by EA type in 1995 and by province and by transitional metropolitan and district councils in 1997. In both cases, independent samples of EAs were drawn for each stratum within each province, with the smaller provinces given a disproportionately larger number of EAs than the bigger provinces. In each year, 3000 EAs were

drawn as primary sampling units (PSUs) with the probability of an individual EA within a stratum being chosen being proportional to the number of households in the EA. Finally, ten households were selected in each EA by means of systematic sampling to give the 30000 households visited as ultimate sampling units in the surveys.

Prior to the introduction of the Labor Force Survey in January 2000, the OHS was the only source of official data on the hours and earnings of individual workers in post-apartheid South Africa. For our analysis of racial wage rate differentials we initially restricted the sample from the OHS to male employees, aged between 15 and 64 and working full-time as non-migrant workers in all sectors other than agriculture forestry and fishing, mining and quarrying, and the armed services. We excluded female and part-time workers on the grounds that these categories of workers might face discrimination on the basis of gender and employment status, which could bias our estimates of the extent of racial wage discrimination. The age restrictions limit the sample to adults not engaged in retirement occupations. Migrant workers are excluded as the OHS only collects full information in respect of persons who normally reside at least four nights a week in sampled households. Workers in the agricultural sector are excluded due to inconsistencies in the enumeration of agricultural workers caused by changes to the identification procedure for non-urban areas between 1995 and 1997. Workers in the mining industry are excluded due to uncertainty as to the coverage of people living in hostels in the 1997 OHS. Finally, South African Defense force members are excluded, as the 1995 OHS does not contain a detailed breakdown of military occupations.

We further restricted the sample to those workers for which we could calculate reliable estimates of hourly wages and for which no data were missing on the independent variables specified in the wage functions. Hourly wage rates were calculated from the OHS data by converting all reported earnings data to a weekly basis and dividing by hours worked in the past seven days. Nevertheless, the OHS is not ideally suited for this purpose because the information

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on hours worked relate to the total hours worked by an individual in the last seven days in all economic activities whereas the information on earnings relates to total salary/pay (including overtime and bonus but before deductions) in main employment. To ensure the reliability of our hourly wage rate estimates we therefore excluded those employees who either had not worked at least 35 hours in the past seven days,[1] or could be identified as being engaged in economic activities other than their main job (either as employees[2] or on own account), or had reported earnings on a daily basis. Information on wages is reported either as an exact amount and/or within pre-specified intervals on a daily, weekly, monthly or annual[3] basis and therefore the data on the dependent variable consist of both point and interval observations. The OHS also provides data on worker and job attributes, including age, education attainment, occupation, industry, job tenure, trade union membership, location of workplace, and rural-urban locality of workers. This information was used to specify the determinants of the wage function.

The final sample contained 10220 observations representing nearly 2.5 million workers in 1995 and 10419 observations representing nearly 3 million workers in 1997. Tables 1 and 2 present descriptive statistics for these raised samples. They show that the racial composition of the workforce covered by our samples was relatively stable over the two years, with 62% of workers black, 13% colored, 5% asian and 20% white in 1997. The average age of the workforce was 37 years in both samples with comparatively little variation between racial groups. This racial uniformity is the result both of demographic factors and of labor participation rates with high levels of youth unemployment, particularly amongst blacks (Standing et al., 1996). The educational background of the racial groups differs markedly with over 99% of white workers and 95% of asians having completed at least a secondary education in comparison to the 15% of colored workers and 26% of blacks with no more than a primary education in 1997. Such racial

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[1] The 1997 OHS further allowed us to identify workers who worked a 'normal' week in the past seven days. Limiting the sample to these workers did not appreciably affect the results of the decomposition analysis for 1997.
[2] The 1995 OHS does not enable workers holding multiple jobs to be identified.
[3] In the 1997 OHS, respondents were not given the option of reporting earnings on an annual basis.

TABLE 1. MEAN CHARACTERISTICS OF RAISED SAMPLE BY RACIAL GROUP 1995

Variable	Attribute	Racial group				
		All races	Black	Coloured	Asian	White
AGE	Age (in years)	37.147	37.916	34.434	35.337	37.092
AGESQ	AGE^2	1486.81	1535.50	1286.79	1358.40	1500.22
EDPRIM	No/Primary education	0.148	0.219	0.173	0.023	0.001
EDSECO	Secondary education	0.682	0.650	0.756	0.837	0.685
EDDIPL	Diploma	0.109	0.096	0.057	0.072	0.173
EDDEGR	Degree	0.060	0.034	0.014	0.068	0.141
OCCMAN	Managers	0.059	0.019	0.020	0.076	0.169
OCCPRO	Professionals	0.043	0.025	0.016	0.045	0.097
OCCTEC	Technicians & associate professionals	0.119	0.093	0.076	0.108	0.201
OCCCLE	Clerks	0.097	0.099	0.097	0.183	0.075
OCCSER	Service and sales	0.153	0.162	0.125	0.182	0.138
OCCCAT	Crafts and trade	0.180	0.141	0.271	0.212	0.221
OCCSSK	Semi-skilled	0.191	0.247	0.171	0.155	0.082
OCCUSK	Unskilled	0.157	0.215	0.224	0.039	0.018
INDEGW	Electricity, Gas & Water	0.019	0.018	0.010	0.005	0.026
INDCON	Construction	0.081	0.078	0.159	0.054	0.058
INDWRT	Wholesale & Retail Trade	0.193	0.181	0.212	0.333	0.180
INDTSC	Transport, Storage & Communication	0.100	0.096	0.086	0.074	0.123
INDFIN	Financial	0.078	0.061	0.050	0.073	0.131
INDCSV	Community services	0.268	0.305	0.220	0.134	0.237
INDMNF	Manufacturing	0.261	0.261	0.263	0.328	0.245
TENURE	Time in current job (in years)	8.180	8.434	6.311	8.104	8.519
TENSQ	$TENURE^2$	125.215	126.731	86.050	132.602	139.109
TUMEM	Trade union membership (Member=1)	0.403	0.470	0.388	0.312	0.274
WREGWC	Western Cape	0.135	0.043	0.638	0.027	0.130
WREGEC	Eastern Cape	0.088	0.100	0.098	0.015	0.069
WREGNC	Northern Cape	0.013	0.005	0.056	0.000	0.015
WREGFS	Free State	0.056	0.068	0.018	0.000	0.058
WREGNW	North-West	0.052	0.067	0.011	0.009	0.048
WREGGA	Gauteng	0.385	0.406	0.110	0.156	0.525
WREGET	Eastern Transvaal	0.048	0.068	0.005	0.006	0.031
WREGNP	Northern Province	0.034	0.046	0.026	0.002	0.018
WREGKN	Kwazulu/Natal	0.189	0.197	0.038	0.785	0.107
RURAL	Rural-urban: (Rural = 1)	0.181	0.273	0.056	0.037	0.061
	Mean logarithm of hourly wage	2.324	2.031	2.036	2.546	3.094
	Sample size	6867	3616	1217	547	1487
	Raised sample size	2475088	1424678	298711	138869	612830
	Percentage raised sample		57.56	12.07	5.61	24.76

Source: authors' calculations based on 1995 OHS data.

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TABLE 2. MEAN CHARACTERISTICS OF RAISED SAMPLE BY RACIAL GROUP 1997

			Racial group			
Variable	Attribute	All races	Black	Coloured	Asian	White
AGE	Age (in years)	37.199	37.550	35.055	36.352	37.702
AGESQ	AGE^2	1487.25	1504.96	1337.21	1443.62	1539.70
EDPRIM	No/Primary education	0.181	0.257	0.149	0.020	0.004
EDSECO	Secondary education	0.663	0.649	0.773	0.826	0.597
EDDIPL	Diploma	0.108	0.073	0.058	0.082	0.255
EDDEGR	Degree	0.049	0.021	0.021	0.072	0.145
OCCMAN	Managers	0.086	0.041	0.065	0.161	0.222
OCCPRO	Professionals	0.079	0.056	0.043	0.097	0.170
OCCTEC	Technicians & associate professionals	0.076	0.051	0.078	0.105	0.145
OCCCLE	Clerks	0.064	0.058	0.069	0.143	0.061
OCCSER	Service and sales	0.127	0.144	0.104	0.111	0.095
OCCCAT	Crafts and trade	0.197	0.196	0.248	0.141	0.178
OCCSSK	Semi-skilled	0.163	0.204	0.130	0.124	0.068
OCCUSK	Unskilled	0.207	0.249	0.262	0.117	0.062
INDEGW	Electricity, Gas & Water	0.026	0.025	0.021	0.009	0.037
INDCON	Construction	0.089	0.095	0.136	0.039	0.054
INDWRT	Wholesale & Retail Trade	0.177	0.172	0.163	0.243	0.186
INDTSC	Transport, Storage & Communication	0.100	0.099	0.092	0.074	0.115
INDFIN	Financial	0.096	0.080	0.087	0.093	0.151
INDCSV	Community services	0.243	0.265	0.229	0.152	0.209
INDMNF	Manufacturing	0.268	0.264	0.273	0.389	0.249
TENURE	Time in current job (in years)	7.978	7.862	6.986	8.446	8.864
TENSQ	$TENURE^2$	124.569	118.428	104.801	141.501	152.238
TUMEM	Trade union membership (Member=1)	0.424	0.472	0.448	0.402	0.267
WREGWC	Western Cape	0.160	0.052	0.683	0.034	0.187
WREGEC	Eastern Cape	0.076	0.084	0.094	0.020	0.057
WREGNC	Northern Cape	0.020	0.011	0.072	0.002	0.020
WREGFS	Free State	0.058	0.070	0.019	0.001	0.061
WREGNW	North-West	0.052	0.073	0.004	0.022	0.027
WREGGA	Gauteng	0.348	0.382	0.090	0.175	0.451
WREGET	Eastern Transvaal	0.060	0.073	0.004	0.011	0.066
WREGNP	Northern Province	0.056	0.085	0.001	0.000	0.016
WREGKN	Kwazulu/Natal	0.169	0.170	0.033	0.735	0.116
RURAL	Rural-urban: (Rural = 1)	0.196	0.295	0.048	0.020	0.024
	Mean logarithm of hourly wage	2.249	1.937	2.220	2.611	3.145
	Sample size	7831	4895	1431	385	1120
	Raised sample size	2927629	1818518	379801	140157	589153
	Percentage raised sample		62.12	12.97	4.79	20.12

Source: authors' calculations based on 1997 OHS data.

disparities are, in part, the outcome of past apartheid educational policies such as the *Bantu Education Act 1955*, which limited the provision of schooling to native blacks. Non-white educational standards were improved following the *de Lange Commission 1979* and, more recently, the passage of the *National Education Policy Act 1996*, but any resultant convergence in the educational attainment of workers will inevitably be slow given both the low rate of turnover of the labor force and the perpetuation of disadvantage caused by household financial constraints to participation in education (Case and Deaton, 1998). The relatively low levels of education received by black and colored workers was reflected in a marked over-representation of black and colored workers in unskilled and semi-skilled occupational groups as compared to asians and whites who were more likely to work in white-collar occupations. Nevertheless, members of all racial groups participated in all occupations and sectors within the highly diversified economy. Length of service in the current job was roughly 8 years on average with little variation among racial groups. More than 40% of the workforce was a trade union member in 1995, with participation rates increasing particularly among colored and asian workers. Finally, the raised sample statistics reveal regional concentrations of asian employment in Kwazulu/Natal and Gauteng and of coloreds in Western and Northern Cape, surrounding Cape Town and Kimberley respectively, with far more uniform distributions of white and black employment. These distributions strongly reflect historic settlement patterns and the influence of legislation, such as the *Group Areas Act 1950*, which is also partly responsible for black and colored workers having been more likely to reside in areas designated as rural than are whites and asians.

Tables 3 and 4 report the results of the wage function analysis based on estimating separate wage functions for each of the racial groups and for all groups together (Equations 3 and 4) using the 1995 and 1997 OHS data. Given that the observations on the dependent variable consist of a mixture of point and interval data, a generalised Tobit estimator (StataCorp,

TABLE 3: HOURLY WAGE FUNCTIONS BY RACIAL GROUP 1995

	Racial group									
	All		Black		Coloured		Asian		White	
Variable	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
AGE	0.0306#	0.0061	0.0288#	0.0089	0.0545#	0.0110	0.0554#	0.0171	0.0954#	0.0102
AGESQ	-0.0003#	0.0001	-0.0003#	0.0001	-0.0006#	0.0001	-0.0005*	0.0002	-0.0011#	0.0001
EDSECO	0.4048#	0.0274	0.2424#	0.0296	0.3053#	0.0508	0.3005#	0.1061	0.9423	0.6673
EDDIPL	0.6529#	0.0430	0.4963#	0.0566	0.5151#	0.0836	0.8525#	0.1247	1.0924	0.6681
EDDEGR	0.9395#	0.0620	0.8763#	0.1011	0.8646#	0.2004	0.9521#	0.1722	1.3272*	0.6687
OCCMAN	1.2800#	0.0469	0.9622#	0.0966	0.8283#	0.1305	0.6093#	0.1443	0.7821#	0.1128
OCCPRO	0.9747#	0.0645	0.6789#	0.1048	0.9539#	0.1536	0.4177*	0.2023	0.6131#	0.1243
OCCTEC	0.9816#	0.0371	0.7390#	0.0510	0.9206#	0.0811	0.5772#	0.1390	0.6661#	0.1087
OCCCLE	0.5238#	0.0365	0.4897#	0.0460	0.4735#	0.0671	0.3160*	0.1364	0.3028#	0.1153
OCCSER	0.4760#	0.0341	0.3666#	0.0391	0.3730#	0.0647	0.1815	0.1520	0.3235#	0.1115
OCCCAT	0.5319#	0.0319	0.2832#	0.0384	0.4069#	0.0543	0.1209	0.1379	0.4002#	0.1065
OCCSSK	0.3132#	0.0293	0.3148#	0.0339	0.3180#	0.0585	0.1166	0.1380	0.2176	0.1146
INDEGW	0.1573#	0.0601	0.1689*	0.0778	0.0997	0.1583	0.6511#	0.1916	0.0209	0.0783
INDCON	-0.1914#	0.0425	-0.0935	0.0602	-0.1017	0.0661	-0.0665	0.1391	-0.1162	0.0738
INDWRT	-0.2142#	0.0296	-0.2204#	0.0405	-0.1082	0.0575	-0.0760	0.0849	-0.1723#	0.0512
INDTSC	-0.0097	0.0291	-0.0128	0.0403	0.0477	0.0738	0.1207	0.0761	-0.1095*	0.0497
INDFIN	-0.0145	0.0376	-0.0527	0.0482	-0.0473	0.0849	0.0181	0.1286	0.0486	0.0564
INDCSV	-0.0516	0.0297	0.0252	0.0380	0.0138	0.0576	-0.0133	0.0893	-0.0943	0.0526
TENURE	0.0334#	0.0033	0.0311#	0.0043	0.0370#	0.0073	0.0411#	0.0085	0.0335#	0.0058
TENSQ	-0.0007#	0.0001	-0.0006#	0.0001	-0.0008#	0.0003	-0.0012#	0.0003	-0.0007#	0.0002
TUMEM	0.0482*	0.0194	0.1469#	0.0246	0.1770#	0.0380	0.0308	0.0602	0.0638*	0.0304
WREGWC	-0.0429	0.0393	-0.0789	0.0894	-0.2925#	0.0686	-0.1223	0.1213	-0.0645	0.0618
WREGEC	-0.1014#	0.0384	-0.0803	0.0476	-0.3688#	0.0919	-0.1877	0.1133	-0.0969	0.0715
WREGNC	-0.2144#	0.0778	-0.3333	0.1780	-0.5744#	0.0998	-0.4448#	0.0871	-0.1145	0.0970
WREGFS	-0.3422#	0.0569	-0.4486#	0.0505	-0.5801#	0.1906	-	0.0000	-0.0094	0.0674
WREGNW	-0.1308*	0.0573	-0.1276*	0.0640	-0.3673*	0.1723	0.4112#	0.1054	-0.0614	0.0746
WREGGA	0.1944#	0.0322	0.1620#	0.0376	0.1993*	0.0844	0.2048*	0.0972	0.1962#	0.0502
WREGET	-0.1258*	0.0513	-0.1537#	0.0524	0.2074	0.1434	0.4889*	0.2268	0.0779	0.0704
WREGNP	0.1400*	0.0559	0.1722#	0.0608	0.2348	0.2224	1.4562#	0.1286	0.0915	0.0926
RURAL	-0.2524#	0.0317	-0.1550#	0.0341	-0.1761	0.1571	-0.4801#	0.1255	-0.0653	0.0800
Constant	0.6008#	0.1200	0.6972#	0.1779	0.3805	0.2166	0.4862	0.3399	-0.6024	0.6978
Model χ^2	1727066#		781781#		215645#		90899#		411248#	

# Denotes significance at the 1% level. * Denotes significance at the 5% level.

TABLE 4. HOURLY WAGE FUNCTIONS BY RACIAL GROUP 1997

	Racial group									
	All		Black		Coloured		Asian		White	
Variable	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
AGE	0.0404#	0.0062	0.0520#	0.0081	0.0585#	0.0106	0.0688#	0.0177	0.0692#	0.0155
AGESQ	-0.0004#	0.0001	-0.0006#	0.0001	-0.0007#	0.0001	-0.0008#	0.0002	-0.0008#	0.0002
EDSECO	0.3841#	0.0249	0.2510#	0.0248	0.2291#	0.0642	0.2497	0.1497	0.8416	0.4574
EDDIPL	0.8404#	0.0400	0.7021#	0.0494	0.7935#	0.0909	0.5991#	0.1686	0.9375*	0.4588
EDDEGR	1.1053#	0.0646	1.0964#	0.0699	1.0712#	0.1179	0.5183#	0.2009	1.1310*	0.4649
OCCMAN	0.9182#	0.0437	0.6369#	0.0564	0.5264#	0.0845	0.3970#	0.1302	0.5357#	0.0999
OCCPRO	0.8018#	0.0489	0.6552#	0.0588	0.5915#	0.1040	0.5186#	0.1548	0.4685#	0.1139
OCCTEC	0.7004#	0.0441	0.6138#	0.0566	0.5180#	0.0721	0.3207#	0.1203	0.3143#	0.1155
OCCCLE	0.4222#	0.0366	0.3739#	0.0438	0.4108#	0.0672	0.2184	0.1192	0.0349	0.1087
OCCSER	0.2652#	0.0362	0.2333#	0.0404	0.3279#	0.0682	0.3492#	0.1325	0.0830	0.1177
OCCCAT	0.3431#	0.0309	0.2965#	0.0328	0.2614#	0.0526	-0.0345	0.1176	0.1309	0.1065
OCCSSK	0.1902#	0.0299	0.2510#	0.0323	0.2184#	0.0654	-0.2194	0.1349	-0.0831	0.1234
INDEGW	0.1318*	0.0585	0.2087#	0.0684	0.0961	0.0820	-0.0425	0.3218	-0.0206	0.1205
INDCON	-0.1045#	0.0369	-0.0329	0.0406	-0.0696	0.0620	0.1590	0.1170	-0.1599	0.1214
INDWRT	-0.1657#	0.0297	-0.1709#	0.0339	-0.1512#	0.0575	-0.0994	0.0800	-0.1468*	0.0701
INDTSC	0.0030	0.0361	-0.0904*	0.0363	0.0014	0.0803	0.0108	0.1270	0.0652	0.0793
INDFIN	0.0199	0.0415	-0.0957	0.0493	0.0315	0.0882	0.1367	0.0984	0.1346	0.0744
INDCSV	-0.0230	0.0290	0.0228	0.0332	0.0870	0.0503	0.0336	0.0831	-0.0693	0.0772
TENURE	0.0307#	0.0036	0.0339#	0.0039	0.0222#	0.0070	0.0216*	0.0104	0.0148	0.0087
TENSQ	-0.0005#	0.0001	-0.0007#	0.0001	-0.0005	0.0003	-0.0005	0.0004	0.0000	0.0003
TUMEM	0.0456*	0.0206	0.1875#	0.0230	0.1385#	0.0358	0.0300	0.0677	-0.1034*	0.0507
WREGWC	0.0401	0.0405	-0.0143	0.0531	-0.3699*	0.1473	-0.0226	0.1083	-0.0319	0.0968
WREGEC	-0.1229*	0.0545	-0.0822	0.0552	-0.5445#	0.1616	0.2193	0.1498	-0.1456	0.1415
WREGNC	-0.3197#	0.0685	-0.3362#	0.0871	-0.7220#	0.1573	0.5361#	0.1667	-0.5731*	0.2365
WREGFS	-0.4191#	0.0549	-0.4203#	0.0466	-0.8260#	0.2305	-0.1368	0.1692	-0.2628*	0.1085
WREGNW	-0.2638#	0.0500	-0.1939#	0.0450	-0.3557	0.2746	0.2612	0.2366	-0.4823*	0.1889
WREGGA	0.0708	0.0372	0.0961#	0.0329	-0.1724	0.1598	0.2383#	0.0855	0.0691	0.0902
WREGET	-0.2242#	0.0555	-0.2659#	0.0427	-0.5081*	0.2157	-0.3181	0.1680	-0.0753	0.1102
WREGNP	-0.2872#	0.0504	-0.2418#	0.0472	-0.1531	0.1757	0.0000	0.0000	-0.1400	0.2427
RURAL	-0.3469#	0.0290	-0.1955#	0.0296	-0.3432#	0.1170	-0.4392#	0.0938	-0.3499*	0.1586
Constant	0.6074#	0.1207	0.3007	0.1591	0.8077#	0.2387	0.6261	0.3437	0.4942	0.5291
Model χ^2	1668887#		846676#		180925#		59480#		198191#	

# Denotes significance at the 1% level. * Denotes significance at the 5% level.

1997) is used for estimation. Observations are weighted to reflect estimates of population size using the 1991 Census in the case of the 1995 OHS and the 1996 Census, as adjusted by a post-enumeration survey, in the case of the 1997 OHS. The associated standard errors are heteroskedastic-consistent and allow for the clustering of the sample with the EA identified as the PSU. However we do not allow for the stratification of the sample as the OHS data made available by Statistics South Africa do not explicitly identify the stratum. This failure to take the complex sample design fully into account may be expected to give rise to needlessly large estimates of the standard errors.

The base case in each function is defined as a non-union worker with no more than a primary education, employed in an unskilled occupation in the manufacturing sector, and resident in an urban area of Kwazulu/Natal. In all cases the overall fit of the regressions as measured by the χ^2 statistic was highly significantly different from zero. The decomposition analysis requires that an identical set of variables should be included in all the wage functions and insignificant variables were therefore retained in some regressions. Nevertheless, the results show that most of the coefficients were significant at the 95 per cent level or higher with signs generally conforming to expectations.

Because the dependent variable is expressed in log form, the coefficients can be interpreted as the proportional increase in the wage rate expected for a unit increase in the explanatory variable, with the exception of the two variables involving squared terms. The coefficients on the age variables are consistent with human capital theory in that the estimated age-earnings profiles are all concave with the highest wage rates being paid to workers in their early forties, *ceteris paribus*. The returns to education are consistently positive for all races such that the majority of workers, who have a secondary level of education, earn more than those workers with no more than a primary standard of education and less than those who have obtained either a diploma or degree. Higher wage rates are linked to higher skills and

responsibilities, with unskilled workers receiving lower wage rates than workers in other occupational categories, and those employed in the managerial, professional or associate professional occupational groups typically earning the most. There is no strong pattern of sectoral wage variation, although the wholesale and retail trades are consistently identified as a low wage sector in comparison to manufacturing. The coefficients on the tenure variables imply that wage rates are typically a concave or linear function of seniority. Trade Union membership is unambiguously associated with higher wages only for blacks and coloureds. Some regional variations in wage rates is evident with the wages typically higher in Gauteng (which includes Johannesburg, Pretoria and Vanderbijlpark) and lower in the Cape and Free State than in Kwazulu/Natal. Finally, the rural-urban dummy is negative for all the regressions indicating that rural workers earn less than urban workers, *ceteris paribus*.

4. Multilateral Decomposition of the Racial Wage Hierarchy

Table 5 provides *prima facie* evidence of South Africa's well-known *hierarchical wage structure*. It shows that whites had the highest geometric mean wage, followed by asians, coloreds and finally blacks who received the lowest geometric mean wage of any racial group in the raised samples extracted from the 1995 and 1997 OHSs. The geometric mean wage of blacks fell and that of other racial groups rose between 1995 and 1997: overall the geometric mean wage of the entire workforce fell over the period. This section provides an analysis of this evolving pattern of racial wage disparities.

Table 6 presents the results of the multilateral decomposition analysis based on the estimated wage functions. The first part of the table presents estimates of the mean logarithmic gross wage differential $ln(\gamma_i+1)$ between each of the four racial groups and the overall geometric mean wage, and the constituent elements from the decomposition of these differentials – the explained racial productivity term $ln(\theta_i+1)$ and unexplained discrimination term $ln(\delta_i+1)$ – under

TABLE 5. GEOMETRIC MEAN HOURLY WAGES BY RACIAL GROUP, 1995 AND 1997

	Racial group				
	All races	Black	Colored	Asian	White
			Rand/hr		
1995	10.22	7.62	7.66	12.76	22.07
1997	9.48	6.94	9.21	13.61	23.22

Source: Authors' estimates from wage function regressions.

TABLE 6. MULTILATERAL DECOMPOSITION OF HOURLY WAGE DIFFERENTIALS BY RACIAL GROUP

		Racial Group							
		Black		Colored		Asian		White	
		Coeff.	*Std. Error*	Coeff.	*Std. Error*	Coeff.	*Std. Error*	Coeff.	*Std. Error*
1995	$ln(\widetilde{\gamma}_i +1)$	-0.293#	0.010	-0.287#	0.022	0.223#	0.035	0.770#	0.016
	$ln(\widetilde{\theta}_i +1)$	-0.139#	0.005	-0.245#	0.018	0.108#	0.018	0.419#	0.009
	$ln(\widetilde{\delta}_i +1)$	-0.153#	0.009	-0.042*	0.021	0.115#	0.031	0.351#	0.017
1997	$ln(\widetilde{\gamma}_i +1)$	-0.312#	0.010	-0.028	0.021	0.362#	0.038	0.896#	0.021
	$ln(\widetilde{\theta}_i +1)$	-0.182#	0.005	-0.020	0.016	0.272#	0.021	0.509#	0.011
	$ln(\widetilde{\delta}_i +1)$	-0.130#	0.008	-0.008	0.019	0.090*	0.036	0.387#	0.021
Changes 1995-97									
Gross change in $ln(\widetilde{\gamma}_i +1)$		-0.019	0.014	0.259#	0.030	0.139#	0.052	0.126#	0.027
Gross change in $ln(\widetilde{\theta}_i +1)$		-0.042#	0.007	0.225#	0.024	0.164#	0.027	0.090#	0.014
- due to changes in:- characteristics		-0.013	0.008	0.105#	0.026	0.133#	0.025	0.083#	0.015
residual		-0.030#	0.007	0.120#	0.024	0.031	0.027	0.007	0.016
Gross change in $ln(\widetilde{\delta}_i +1)$		0.023	0.012	0.034	0.029	-0.025	0.048	0.036	0.027
- due to changes in:- coefficients		0.028*	0.013	0.083#	0.030	-0.005	0.052	0.051	0.030
residual		-0.004	0.012	-0.049	0.028	-0.020	0.055	-0.015	0.032
1995					*Percentages*				
Gross wage differential: $\widetilde{\gamma}_i$		-25.4		-25.0		24.9		116.0	
- due to:-productivity differential: $\widetilde{\theta}_i$		-13.0		-21.7		11.4		52.0	
discrimination: $\widetilde{\delta}_i(\widetilde{\theta}_i +1)$		-12.4		-3.2		13.6		64.0	
Discrimination coefficient: $\widetilde{\delta}_i$		-14.2		-4.1		12.2		42.1	
1997									
Gross wage differential: $\widetilde{\gamma}_i$		-26.8		-2.8		43.6		145.1	
- due to:-productivity differential: $\widetilde{\theta}_i$		-16.6		-2.0		31.3		66.4	
discrimination: $\widetilde{\delta}_i(\widetilde{\theta}_i +1)$		-10.2		-0.8		12.3		78.7	
Discrimination coefficient: $\widetilde{\delta}_i$		-12.2		-0.8		9.4		47.3	

Notes: # Denotes significance at the 1% level. * Denotes significance at the 5% level.

the hypothetical non-discriminatory wage structure outlined in Section 2. Both the productivity and discrimination terms can be either positive or negative. A positive (negative) productivity term implies that a given racial group receives a wage premium (discount) due to the group having higher (lower) productivity levels on average than the typical worker in the workforce as a whole. A positive (negative) discrimination term is indicative that the typical worker in a particular racial group is overpaid (underpaid) relative to what he would receive in the absence of discrimination. Note that the productivity and discrimination terms sum to the mean logarithmic gross wage differential by construction.

From Table 6, the hierarchical wage structure is evident from the estimates of $ln(\gamma_i+1)$ for both years. These imply that typical white and asian workers earned significantly more than the overall geometric mean wage, while typical black and colored workers were paid less than this amount. Between 1995 and 1997, the gross wage premiums of whites and asians both increased significantly while the gross wage deficit of coloreds fell to such an extent that the colored geometric mean wage was no longer significantly below that of the whole workforce by the end of the period. These changes have further exacerbated the position of blacks relative to all other groups with the racial wage hierarchy becoming more pronounced as a result.

The decomposition of the gross logarithmic wage gaps indicates that whites and asians would have commanded a premium in 1995 in the absence of labor market discrimination due to above average productivity levels while the wages of coloreds and blacks in 1995 would have been subject to a discount because of below average productivity levels. Changes in the productivity terms between 1995 and 1997 were largely responsible for the changes in the gross logarithmic wage differentials. The black disadvantage increased significantly though this was largely due to the unfavorable effect on relative black wages of changes in predicted non-discriminatory returns between 1995 and 1997, and can not be attributed to a relative deterioration in black characteristics priced at 1995 non-discriminatory returns. In contrast, the

colored productivity disadvantage was virtually eliminated by 1997, at least in part as a result of a significant improvement in the quality of colored workers relative to the entire workforce. And the asian and white productivity advantages were both significantly reinforced by relative improvements in the characteristics of asian and white workers. Taken as a whole, these results provide evidence that the productivity basis for racial disparities in hourly wages has been reinforced over the period.

Productivity differentials were augmented by wage discrimination in the case of black, asian and white workers, with the results pointing to black underpayments due to employer discrimination and white and asian overpayments associated with employer nepotism and/or employee discrimination. None of the changes in the discrimination terms between 1995 and 1997 were significant. But changes in relative returns to characteristics between 1995 and 1997 would have led to significant reductions in the size of the black and colored discrimination terms if they had not been offset by the effects of changes in workforce characteristics over the period. There is thus limited evidence of some reduction in the relative magnitude of unexplained racial differences in wages which might be due to a reduction either in market discrimination *per se* or in racial differences in the unobservable characteristics of workers.

The final part of Table 6 restates the decomposition results in a more readily intelligible form by expressing the gross wage, productivity and discrimination differentials as a percentage of the overall geometric mean wage in each year. Thus in 1995, the average black, colored, asian and white worker respectively earned 25% less, 25% less, 25% more and 116% more than the typical worker who earned the geometric mean wage rate of 10.22 Rands per hour. However, these figures should not be taken simply to imply that workers of different races working side by side in identical jobs in the same establishment were paid differently. Rather the differentials likely reflect differences between jobs that fall within the same broad occupational categories of the survey, differences between establishments and so forth. As such,

they reflect a combination of the effects of disadvantage and of discrimination in compensation and in hiring.

The decomposition of the gross wage differential into the productivity differential and a residual discrimination term exploits the condition that the overall geometric mean wage is identical under the discriminatory and non-discriminatory wage structures. The results for 1995 indicate that in the case of black workers the wage differential is attributable equally to productivity shortfalls and to racial underpayments whereas for coloreds the wage differential can be attributed largely to productivity discounts. In contrast, some 55% of the gross wage differential of both asian and white workers may be attributable to discriminatory overpayments. However, productivity discounts for black workers and productivity premiums for asian workers are markedly more important in the 1997 findings where they account for 62% and 72% of the gross wage differential respectively.

The discrimination coefficients are also reported in the final part of Table 6, and measure the amount by which a racial group was underpaid/overpaid relative to the wage it would hypothetically have received in a perfectly competitive labor market. Between 1995 and 1997 these discrimination coefficients were relatively stable showing little real change. Thus in 1997 the wages of a typical black, colored, asian and white worker were respectively 12% lower, 1% lower, 9% higher and 47% higher than they would have been in the absence of discrimination. Noting that the overall geometric mean wage rate would have been identical in the absence of discrimination, these estimates suggest the scale of the wage adjustments faced by the various racial groups if wage discrimination was to be eradicated in the labor market. However, it is important to realize that the eradication of wage discrimination would not by itself bring about total wage convergence since this also requires the elimination of racial productivity differentials.

5. Historical Analysis

Previous studies of the South African labor market, have provided limited evidence, based on binary comparisons between assorted pairs of racial groups in various years, of a gradual erosion of the racial wage hierarchy in the decades prior to the end of the apartheid era (Knight and McGrath, 1987; Moll, 1992; Moll, 1995; Treiman et al., 1996). In particular, Moll (1995) finds that the geometric mean wage of black workers rose from 18% to 24% of the corresponding white wage between 1980 and 1993, based on data from the 1980 Census of South Africa (CSA) and the 1993 Project for Statistics on Living Standards and Development survey. Using a multinomial logit technique, he further shows that the proportion of the gross earnings differential accounted for by wage discrimination fell from 75% in 1980 to 44% in 1993. Treiman et al. (1996) more broadly examines white/non-white annual income differentials for all income earners using data drawn from the 1980 CSA and the 1991 CSA. Their 'overall picture shows more stability than change' (p. 111): the typical black, colored and asian income earner respectively received 13%, 20% and 37% of their white counterpart in 1980, and received 16%, 20% and 40% as much in 1991. The percentage of the gross differential attributed to discrimination (based on the white income structure) fell from 66% to 59% for blacks, from 44% to 38% for coloreds and from 65% to 64% for asians. In this section we seek to confirm the existence of a long-term decrease in racial wage disparities and examine the post-apartheid evolution of the racial wage hierarchy in the light of this secular decline.

For this purpose we extend our study using data derived from the 5% public use sample of the 1980 CSA.[4] While this source of data does not allow us to replicate our hourly wage function analysis based on the 1995 and 1997 OHS, it does provide sufficient information to estimate a rudimentary wages function based on a restricted sample and using monthly earnings data. In comparison to our original analysis, the sample is limited geographically as the 1980

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[4] We are grateful to Moll for providing us with this data.

CSA did not include the former TBVC states and, following Moll (1992), we further exclude under 20 year olds due to conscription of whites in the apartheid era. Secondly, the dependent variable in the wage functions had to be specified as earnings per month since the 1980 CSA did not include questions on the hours worked by respondents. This may lead to some bias in the resultant decomposition analysis as possible racial differences in the supply of labor can not be taken into account. Finally, the set of explanatory variables is curtailed by the absence of data on job tenure and trade union membership. Moreover, location is based on place of residence rather than of work.

Using the (unweighted) 1980 CSA data, we obtained generalized Tobit estimates of the monthly earnings functions together with the associated heteroscedasticity-consistent standard errors. We also estimated monthly earnings functions for 1995 and 1997 on the basis of the 1980 specification to provide comparable results for the decomposition analysis. The overall fit of these earnings functions were again highly significant, and most of the coefficients were significant at the 95% level or higher with signs conforming to expectations.[5] Table 7 presents the results of the decomposition analysis based on the monthly earnings functions. The decomposition results for 1995 and 1997 are broadly consistent with those from the hourly wage analysis presented in Table 6, providing some evidence of the robustness of the empirical findings to changes in model specification.

Two main points emerge from the changes in the gross logarithmic wage differentials between 1980 and 1995. First, the overall racial wage hierarchy was compressed in the latter years of apartheid. The gross logarithmic wage deficit of blacks and the gross wage logarithmic premium of whites both declined significantly, leading to a fall in the white/black logarithmic wage differential from 1.698 to 1.156 over the period. Second, there was some polarization of wage

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[5] The sample characteristics and monthly earnings functions for the historical analysis are presented in a set of supplementary tables at the end of the paper.

TABLE 7. MULTILATERAL DECOMPOSITION OF MONTHLY EARNINGS DIFFERENTIALS BY RACIAL GROUP

		Racial Group							
		Black		Colored		Asian		White	
		Coeff.	*Std. Error*	Coeff.	*Std. Error*	Coeff.	*Std. Error*	Coeff.	*Std. Error*
1980	$ln(\widetilde{\gamma}_i +1)$	-0.663#	0.002	-0.230#	0.005	0.054#	0.006	1.035#	0.002
	$ln(\widetilde{\theta}_i +1)$	-0.334#	0.001	-0.140#	0.003	0.034#	0.003	0.530#	0.002
	$ln(\widetilde{\delta}_i +1)$	-0.328#	0.002	-0.089#	0.004	0.019#	0.006	0.506#	0.003
1995	$ln(\widetilde{\gamma}_i +1)$	-0.351#	0.012	-0.312#	0.023	0.231#	0.032	0.805#	0.017
	$ln(\widetilde{\theta}_i +1)$	-0.160#	0.006	-0.267#	0.017	0.114#	0.019	0.425#	0.009
	$ln(\widetilde{\delta}_i +1)$	-0.191#	0.011	-0.045*	0.022	0.117#	0.031	0.380#	0.019
1997	$ln(\widetilde{\gamma}_i +1)$	-0.326#	0.011	-0.086#	0.020	0.290#	0.037	0.876#	0.022
	$ln(\widetilde{\theta}_i +1)$	-0.176#	0.005	-0.088#	0.016	0.265#	0.020	0.473#	0.010
	$ln(\widetilde{\delta}_i +1)$	-0.150#	0.009	0.003	0.020	0.025	0.035	0.403#	0.020
Changes 1980-1995									
Gross change in $ln(\widetilde{\gamma}_i +1)$		0.312#	0.008	-0.082#	0.020	0.177#	0.025	-0.230#	0.013
Gross change in $ln(\widetilde{\theta}_i +1)$		0.175#	0.006	-0.126#	0.017	0.079#	0.019	-0.105#	0.010
- due to changes in:- characteristics		0.129#	0.002	-0.074#	0.004	0.041#	0.005	-0.029#	0.002
residual		0.046#	0.006	-0.052#	0.017	0.038*	0.019	-0.076#	0.010
Gross change in $ln(\widetilde{\delta}_i +1)$		0.137#	0.012	0.044*	0.022	0.098#	0.032	-0.126#	0.019
- due to changes in:- coefficients		0.176#	0.014	0.032	0.026	0.092*	0.036	-0.122#	0.020
residual		-0.039*	0.018	0.012	0.033	0.005	0.047	-0.004	0.028
Changes 1995-1997									
Gross change in $ln(\widetilde{\gamma}_i +1)$		0.025	0.014	0.226#	0.029	0.059	0.042	0.071#	0.023
Gross change in $ln(\widetilde{\theta}_i +1)$		-0.016*	0.008	0.178#	0.023	0.151#	0.028	0.048#	0.014
- due to changes in:- characteristics		-0.003	0.008	0.091#	0.025	0.124#	0.027	0.073#	0.015
residual		-0.013	0.008	0.087#	0.024	0.027	0.028	-0.025	0.015
Gross change in $ln(\widetilde{\delta}_i +1)$		0.041#	0.014	0.048	0.030	-0.092	0.047	0.023	0.027
- due to changes in:- coefficients		0.049#	0.015	0.087#	0.031	-0.059	0.050	0.047	0.029
residual		-0.009	0.013	-0.039	0.030	-0.032	0.052	-0.023	0.030
1980				*Percentages*					
Gross earnings differential: $\widetilde{\gamma}_i$		-48.5		-20.5		5.5		181.6	
- due to:-productivity differential: $\widetilde{\theta}_i$		-28.4		-13.1		3.5		69.8	
discrimination: $\widetilde{\delta}_i(\widetilde{\theta}_i +1)$		-20.0		-7.4		2.0		111.8	
Discrimination coefficient: $\widetilde{\delta}_i$		-28.0		-8.5		2.0		65.8	
1995									
Gross earnings differential: $\widetilde{\gamma}_i$		-29.6		-26.8		26.0		123.7	
- due to:-productivity differential: $\widetilde{\theta}_i$		-14.8		-23.4		12.1		53.0	
discrimination: $\widetilde{\delta}_i(\widetilde{\theta}_i +1)$		-14.8		-3.4		13.9		70.7	
Discrimination coefficient: $\widetilde{\delta}_i$		-17.4		-4.4		12.4		46.2	
1997									
Gross earnings differential: $\widetilde{\gamma}_i$		-27.8		-8.2		33.6		140.2	
- due to:-productivity differential: $\widetilde{\theta}_i$		-16.1		-8.5		30.3		60.5	
discrimination: $\widetilde{\delta}_i(\widetilde{\theta}_i +1)$		-11.7		0.2		3.3		79.7	
Discrimination coefficient: $\widetilde{\delta}_i$		-14.0		0.3		2.5		49.7	

Notes: # Denotes significance at the 1% level. * Denotes significance at the 5% level.

rates between blacks and coloreds on the one hand and asians and whites on the other, in spite of the overall compression of the racial wage hierarchy. The colored gross logarithmic wage deficit and the asian gross logarithmic wage premium both increased significantly between 1980 and 1995, leading to an increase in the asian/colored logarithmic differential from 0.284 to 0.543 but to decreases in both the colored/black and white/asian logarithmic wage differentials from 0.433 to 0.039 and from 0.981 to 0.574 respectively.

The decomposition analysis shows that the changes in the gross logarithmic wage differentials between 1980 and 1995 were the result of changes in both the productivity and discrimination components. In the case of blacks, a significant fall in the scale of the productivity discount, due largely to an improvement in black worker characteristics relative to those of the work-force as a whole, was reinforced by a reduction in the extent of discriminatory underpayment as a result of an improvement in black rates of return to characteristics relative to those that would have been paid in a non-discriminatory market. For coloreds, the increase in the gross logarithmic wage deficit was the result of an increase in the productivity discount, at least partially due to a relative deterioration in characteristics of colored workers, which was no more than partially offset by a reduction in the extent of discriminatory underpayments. As with blacks, the improvement in the asian position was the outcome of relative improvements in both characteristics and rates of return to characteristics leading to increases in both the productivity premium and discriminatory over-payment. Finally, the erosion of the white gross logarithmic wage premium was largely the outcome of a relative deterioration in both characteristics and rates of return to characteristics leading to decreases in both the productivity premium and discriminatory over-payment. These results collectively suggest some erosion in both the productivity and discriminatory bases of the racial wage hierarchy over the latter years of the apartheid period.

The changes in the racial wage hierarchy in the latter years of apartheid thus run counter to many of those that occurred in the early post-apartheid era. Between 1995 and 1997, the overall wage hierarchy widened slightly with the white/black gross logarithmic differential rising marginally to 1.202 by 1997. The sharp fall in the colored gross logarithmic wage deficit partially reversed the earlier polarization of wage with the asian/colored differential falling back to 0.353 in 1997 as a result. The characteristics of black workers deteriorated relative to those of workers in all other racial groups. And there was no further convergence of white rates of return to characteristics towards those that would have been paid in a non-discriminatory market. Nevertheless the scale of the changes between 1995 and 1997 were generally small compared to the considerable transformation of the racial wage hierarchy in the preceding 15 years.

This is apparent from the final part of Table 7, which reports the gross wage, productivity and discrimination differentials as a percentage of the overall geometric mean wage of 251 Rand/month in 1980, 2014 Rand/month in 1990, and 1986 Rand/month in 1997. The compression of the racial wage hierarchy is evident with the typical black worker earning 49% less than the geometric mean in 1980 but only 28% less in 1997, and the typical white earning 182% more than the geometric mean in 1980 but only 140% more in 1997. The fall in the productivity gap between whites and all non-white groups between 1980 and 1997 is manifest in the changes in the productivity differentials. And the erosion of the discriminatory basis of the racial wage hierarchy is also clear from the reductions in the magnitudes of the discrimination coefficients over the entire period.

Finally, we consider the binary decomposition of white/non-white gross wage differentials in order to provide results in a similar form to existing estimates in the literature. From Table 7, the typical black worker is calculated to have earned 18%, 31% and 30% of his white counterpart in 1980, 1995 and 1997 respectively, with roughly half of the differential being due to discrimination in each year. Similarly, the typical colored worker earned 28%, 32% and

38% of geometric mean white earnings in the three years, with slightly less than half of the differential being due to discrimination in each year. And the typical asian earned 37%, 56% and 56% as much as the typical white worker, with roughly half of the differential being due to discrimination in 1980 and 1995, and somewhat more than half in 1997. These estimates are broadly consistent with those of Moll (1995) and Treiman et al. (1996) reported earlier, though differences in methodology and years preclude direct comparison.

6. Conclusion

The principle contribution of this paper has been to employ a multilateral decomposition to examine changes in racial wage differentials in the South African labor market between 1995 and 1997, and to view these changes from a longer historical perspective by drawing comparison with estimated differences in 1980. The multilateral decomposition technique permits the joint decomposition of wage differentials between the four racial groups into an explained productivity component and unexplained discrimination component, and distinguishes between over- and underpayments enabling the possible sources of discrimination to be isolated. Thus, this paper extends the work of Knight and McGrath (1987), Moll (1995) and Treiman et al. (1996), which have previously explained discriminatory trends, and advances our understanding of productivity and discriminatory developments in the South African labor market.

Our results suggest that, while the end of apartheid may have been a climacteric political event, it had little immediate economic consequence for labor market outcomes. Our first set of findings, which relate to the decomposition analysis of hourly wage rate data for the early post-apartheid period between 1995 and 1997, point to the continued existence of substantial gross wage differentials between races in the South African labor market. Not only has the apartheid-induced racial wage hierarchy been maintained during this period but the position of the majority black workers has actually deteriorated relative to the overall geometric mean wage while that of

the minority colored, asian and white workers has improved. There is evidence that the productivity basis for racial disparities in hourly wages has been reinforced over these two years and only limited evidence of some reduction in the relative magnitude of unexplained racial differences in wages which might be due to a reduction in market discrimination *per se*. Thus, the end of apartheid has brought about no immediate improvement in the relative status of the majority of South Africans, at least in terms of these labor market outcomes; an experience unlike that of the USA where, following the *Civil Rights Act 1964*, there was a decade of sustained and significant decline in the black/white earnings differential (Donahue and Heckman, 1991).

Nevertheless, when the evolution of the racial wage hierarchy wage is viewed from a longer historical perspective, there is evidence of some long-term erosion in wage differentials in the latter years of apartheid. This emerges from our second set of findings, which relate to the decomposition of monthly earnings data for 1980, 1995 and 1997, and provide evidence of significant compression of the wage hierarchy between 1980 and 1995. In particular there were substantial falls in both the black gross wage deficit and the white gross wage premium which far exceeded the scale of any offsetting increases in the early post-apartheid period. Decomposition of these changes suggests that they were driven by the compression both of productivity differentials as a result in part of some convergence in worker characteristics, and of residual disparities that may be attributable in part to a reduction in discrimination. The resumption of these less discriminatory, more socially equitable longer-term trends will depend critically upon the ability to improve the status of black workers relative to coloreds, asians and, especially, white workers.

In the post-apartheid era, labor market legislation has been subject to fundamental reform with most employees now covered by a single set of labor laws, including those working in agriculture, domestic service and the state (Barker, 1999). The *Labor Relations Act 1995*

codifies the limitations on discrimination set out in the *Bill of Rights* and the *Constitution* (Presidential Commission, 1996), while the *Employment Equity Bill 1998* and the *Basic Conditions of Employment Act 1998* seek to promote equity and efficiency within the labor market. In particular, the *Employment Equity Act* sanctions racial employment targets through the mechanism of affirmative action plans agreed between employers and employees on statutory *Workplace Fora*, and also formalizes powerful rights provided by the *Constitution* for any employee or employment applicant to institute proceedings through the *Commission for Conciliation, Mediation and Arbitration (CCMA)* against an employer for alleged discrimination (Barker, 1999).[6] Finally, the *Promotion of Equality and Prevention of Unfair Discrimination Act 2000* provides more general legislation required by Section 9 of the *Constitution* both to prevent or prohibit unfair discrimination and to promote achievement of equality.

These various labor market measures provide powerful instruments to counter the discriminatory practices and attitudes that have sustained white overpayment and black underpayment. However, the experience of the USA following the *Civil Rights Act* of 1964 suggests that some forms of discrimination can be extremely persistent and not easily countered by legislation. Such discrimination may take the form of social interactions and networks, which may influence behavior (Arrow, 1998, p. 98); informal screening devices biased against specific groups; and other socially-based or covert means. The continuation of racially segregated housing in South Africa may, for example, sustain such social networks, while Standing et al. (1996), and Case and Deaton (1998) provide evidence of informal screening devices adopted in the South African labor market. Moreover, our findings suggest that in 1997 the wage of a typical white worker was 47% higher than it would have been in the absence of discrimination while that of a typical black was 12% below what it would have been in a non-discriminatory market. That white wages would have to fall and black wages rise in order to eradicate

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[6] Under the Act, the burden of proof falls on the employer to prove that there were fair reasons for differentiating

discrimination is not of itself particularly surprising. But, wage adjustments on the required scale seem likely to provoke opposition from adversely affected groups and are only likely to be achievable in the context of a growing economy where opportunities for realignment are more frequent and more easily taken.

Policy initiatives have also been taken to tackle the causes of labor market disadvantage faced by specific racial groups. The *National Education Policy Act 1996, Further Education Training Bill 1998* and *Skills Development Bill 1998* have sought to address the qualitative differences within the education system, in vocational training and skill acquisition opportunities faced by different groups (Standing et al., 1996; Bhorat et al., 1998). While there are clear budgetary constraints to enhancing educational opportunities for the black majority, Moll (1998) argues that school productivity could be raised by certain near-costless reallocations of resources, for example, in favor of computational skills which appear to be more important than comprehension skills in influencing wages. Our results suggest that positive returns to education and training exist for all races, providing the incentives for the blacks to take advantage of these opportunities, while Moll (1996), focussing on primary schooling returns, identifies potential for growth in blacks' returns. Nevertheless, household financial constraints to participation in education (Case and Deaton, 1998) may frustrate attempts to narrow productivity differentials in the absence of significant income and wealth redistribution.

In conclusion, much of the necessary labor market and broader social policies appear now to be in place to offer the opportunity of creating a non-discriminatory labor market. However, this study has shown that while there has been a long-term erosion of the racial wage hierarchy, a narrowing of racial productivity differentials and a reduction in discrimination to the benefit of the majority of South African workers, developments in the early post-apartheid era have been less favorable. Given the persistence of social attitudes and structures and the perpetuation of

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between individuals. According to the South African Business Day (28 December 1998) the CCMA had received

disadvantage, there is a continuing role for the monitoring and analysis of racial wage differentials to inform policy-makers of the effectiveness of policy interventions and to highlight any need for further reforms.

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SUPPLEMENTARY TABLES: ANALYSIS OF MONTHLY EARNINGS 1980, 1995,1997.

TABLE S1. MEAN CHARACTERISTICS OF SAMPLE BY RACIAL GROUP 1980

Variable	Attribute	All races	Black	Coloured	Asian	White
				Racial group		
AGE	Age in years	35.303	34.674	33.643	34.228	36.972
AGESQ	AGE^2	1367.05	1314.19	1246.67	1276.66	1500.61
EDPRIM	No/Primary Education	0.243	0.421	0.237	0.108	0.007
EDSECO	Secondary Education	0.649	0.553	0.717	0.804	0.739
EDDIPL	Diploma	0.070	0.022	0.038	0.054	0.152
EDDEGR	Degree	0.038	0.003	0.008	0.034	0.101
OCCMAN	Managers	0.051	0.005	0.012	0.030	0.135
OCCPRO	Professionals	0.081	0.038	0.053	0.084	0.154
OCCTEC	Technicians and Associate Professionals	0.050	0.012	0.019	0.039	0.117
OCCCLE	Clerks	0.089	0.068	0.080	0.210	0.102
OCCSER	Service and Sales	0.183	0.224	0.133	0.175	0.144
OCCCAT	Crafts and Trade	0.231	0.206	0.348	0.226	0.226
OCCSSK	Semi-skilled	0.188	0.242	0.188	0.183	0.108
OCCUSK	Unskilled	0.128	0.204	0.167	0.053	0.015
INDMNF	Manufacturing	0.328	0.345	0.341	0.421	0.284
INDEGW	Electricity, Gas and Water	0.022	0.022	0.016	0.005	0.026
INDCON	Construction	0.111	0.117	0.195	0.067	0.081
INDWRT	Wholesale and Retail Trade	0.162	0.178	0.146	0.258	0.128
INDTSC	Transport, Storage and Communication	0.113	0.091	0.091	0.078	0.159
INDFIN	Financial	0.048	0.023	0.023	0.042	0.094
INDCSV	Community Services	0.215	0.223	0.187	0.129	0.228
RREGCAP	Cape	0.270	0.154	0.832	0.035	0.279
RREGOFS	Orange Free State	0.060	0.081	0.019	0.000	0.055
RREGTVL	Transvaal	0.475	0.559	0.110	0.137	0.536
RREGNAT	Natal	0.195	0.207	0.039	0.828	0.130
RURAL	Rural-Urban (Rural = 1)	0.134	0.200	0.080	0.063	0.068
	Mean logarithm of monthly earnings	5.526	4.863	5.297	5.580	6.562
	Sample size	123687	60620	14666	6675	41726
	Percentage sample		49.01	11.86	5.40	33.74

Source: authors' calculations based on 5% Public Use Sample of 1980 Population Census data.

TABLE S2. MEAN CHARACTERISTICS OF RAISED SAMPLE BY RACIAL GROUP 1995

| Variable | Attribute | All races | Racial group | | | |
			Black	Coloured	Asian	White
AGE	Age in years	37.231	37.915	34.716	35.785	37.394
AGESQ	AGE^2	1490.83	1533.49	1304.12	1385.50	1518.97
EDPRIM	No/Primary Education	0.143	0.219	0.174	0.023	0.001
EDSECO	Secondary Education	0.688	0.661	0.752	0.832	0.680
EDDIPL	Diploma	0.109	0.091	0.059	0.074	0.176
EDDEGR	Degree	0.060	0.029	0.014	0.070	0.143
OCCMAN	Managers	0.062	0.018	0.020	0.076	0.170
OCCPRO	Professionals	0.043	0.022	0.016	0.046	0.098
OCCTEC	Technicians and Associate Professionals	0.115	0.082	0.073	0.108	0.203
OCCCLE	Clerks	0.095	0.095	0.097	0.182	0.074
OCCSER	Service and Sales	0.147	0.153	0.125	0.181	0.136
OCCCAT	Crafts and Trade	0.189	0.149	0.276	0.213	0.221
OCCSSK	Semi-skilled	0.193	0.259	0.169	0.156	0.080
OCCUSK	Unskilled	0.156	0.221	0.224	0.038	0.017
INDMNF	Manufacturing	0.272	0.281	0.262	0.327	0.245
INDEGW	Electricity, Gas and Water	0.019	0.018	0.010	0.005	0.027
INDCON	Construction	0.083	0.081	0.159	0.055	0.057
INDWRT	Wholesale and Retail Trade	0.195	0.186	0.212	0.335	0.176
INDTSC	Transport, Storage and Communication	0.103	0.101	0.088	0.073	0.123
INDFIN	Financial	0.080	0.061	0.052	0.069	0.132
INDCSV	Community Services	0.248	0.272	0.217	0.136	0.240
RREGCAP	Cape	0.219	0.102	0.799	0.041	0.216
RREGOFS	Orange Free State	0.059	0.077	0.018	0.000	0.055
RREGTVL	Transvaal	0.515	0.589	0.147	0.173	0.621
RREGNAT	Natal	0.206	0.232	0.036	0.786	0.108
RURAL	Rural-Urban (Rural = 1)	0.150	0.229	0.054	0.035	0.062
	Mean logarithm of monthly earnings	7.608	7.257	7.296	7.839	8.413
	Sample size	6121	2937	1192	532	1460
	Raised sample size	2242394	1212709	291642	135215	602827
	Percentage raised sample		54.08	13.00	6.03	26.88

Source: authors' calculations based on 1995 OHS data.

TABLE S3. MEAN CHARACTERISTICS OF RAISED SAMPLE BY RACIAL GROUP 1997

Variable	Attribute	Racial group				
		All races	Black	Coloured	Asian	White
AGE	Age in years	37.242	37.465	35.431	36.753	37.898
AGESQ	AGE^2	1488.35	1496.70	1359.31	1470.35	1551.65
EDPRIM	No/Primary Education	0.174	0.255	0.150	0.020	0.004
EDSECO	Secondary Education	0.667	0.656	0.769	0.827	0.593
EDDIPL	Diploma	0.109	0.068	0.060	0.080	0.257
EDDEGR	Degree	0.051	0.020	0.021	0.072	0.147
OCCMAN	Managers	0.091	0.042	0.067	0.168	0.222
OCCPRO	Professionals	0.080	0.054	0.044	0.097	0.171
OCCTEC	Technicians and Associate Professionals	0.077	0.049	0.077	0.108	0.145
OCCCLE	Clerks	0.062	0.055	0.068	0.141	0.061
OCCSER	Service and Sales	0.125	0.142	0.104	0.116	0.094
OCCCAT	Crafts and Trade	0.194	0.192	0.252	0.132	0.176
OCCSSK	Semi-skilled	0.163	0.208	0.130	0.129	0.069
OCCUSK	Unskilled	0.208	0.258	0.259	0.108	0.061
INDMNF	Manufacturing	0.271	0.269	0.273	0.384	0.249
INDEGW	Electricity, Gas and Water	0.027	0.026	0.021	0.010	0.036
INDCON	Construction	0.089	0.097	0.134	0.039	0.053
INDWRT	Wholesale and Retail Trade	0.178	0.174	0.160	0.246	0.185
INDTSC	Transport, Storage and Communication	0.101	0.100	0.091	0.077	0.116
INDFIN	Financial	0.097	0.079	0.088	0.089	0.152
INDCSV	Community Services	0.237	0.255	0.232	0.155	0.209
RREGCAP	Cape	0.245	0.117	0.849	0.054	0.255
RREGOFS	Orange Free State	0.059	0.070	0.020	0.001	0.067
RREGTVL	Transvaal	0.512	0.618	0.099	0.190	0.562
RREGNAT	Natal	0.183	0.195	0.033	0.755	0.116
RURAL	Rural-Urban (Rural = 1)	0.158	0.244	0.047	0.021	0.024
	Mean logarithm of monthly earnings	7.594	7.268	7.508	7.884	8.470
	Sample size	7048	4184	1389	371	1104
	Raised sample size	2667319	1581624	369059	134434	582202
	Percentage raised sample		59.30	13.84	5.04	21.83

Source: authors' calculations based on 1997 OHS data.

TABLE S4. MONTHLY EARNINGS FUNCTIONS BY RACIAL GROUP 1980

	Racial group									
	All		Black		Coloured		Asian		White	
Variable	Coeff.	*Std. Error*	Coeff.	*Std. Error*	Coeff.	*Std. Error*	Coeff.	*Std. Error*	Coeff.	*Std. Error*
AGE	0.0605#	*0.0013*	0.0434#	*0.0015*	0.0715#	*0.0031*	0.0834#	*0.0043*	0.1173#	*0.0017*
AGESQ	-0.0006#	*0.0000*	-0.0005#	*0.0000*	-0.0008#	*0.0000*	-0.0010#	*0.0001*	-0.0013#	*0.0000*
EDSECO	0.6409#	*0.0048*	0.1705#	*0.0047*	0.3528#	*0.0124*	0.2943#	*0.0208*	0.4130#	*0.0538*
EDDIPL	1.2026#	*0.0096*	0.4966#	*0.0223*	0.8038#	*0.0325*	0.6833#	*0.0371*	0.6341#	*0.0543*
EDDEGR	1.5077#	*0.0124*	0.8908#	*0.0628*	1.0823#	*0.0486*	0.9388#	*0.0537*	0.8028#	*0.0550*
OCCMAN	1.3425#	*0.0107*	0.4406#	*0.0383*	0.8597#	*0.0462*	0.7529#	*0.0525*	0.5916#	*0.0271*
OCCPRO	0.7673#	*0.0111*	0.4123#	*0.0189*	0.6639#	*0.0300*	0.5704#	*0.0413*	0.4338#	*0.0271*
OCCTEC	1.0051#	*0.0109*	0.3130#	*0.0250*	0.6075#	*0.0405*	0.5942#	*0.0426*	0.4405#	*0.0269*
OCCCLE	0.5035#	*0.0089*	0.2449#	*0.0099*	0.4613#	*0.0195*	0.3648#	*0.0294*	0.2485#	*0.0270*
OCCSER	0.2624#	*0.0077*	-0.0002	*0.0074*	0.1760#	*0.0194*	0.2160#	*0.0323*	0.2189#	*0.0271*
OCCCAT	0.4337#	*0.0069*	0.0709#	*0.0068*	0.3466#	*0.0152*	0.2293#	*0.0303*	0.2250#	*0.0264*
OCCSSK	0.2458#	*0.0070*	0.1556#	*0.0065*	0.2640#	*0.0159*	0.1588#	*0.0303*	0.1868#	*0.0270*
INDEGW	0.1504#	*0.0146*	0.0436#	*0.0139*	-0.0392	*0.0340*	0.1590*	*0.0803*	-0.0391*	*0.0152*
INDCON	0.0226#	*0.0075*	-0.0296#	*0.0077*	-0.0290	*0.0151*	0.1916#	*0.0282*	-0.0625#	*0.0108*
INDWRT	-0.1873#	*0.0066*	-0.1566#	*0.0066*	-0.1541#	*0.0161*	-0.0429*	*0.0180*	-0.1138#	*0.0095*
INDTSC	0.0938#	*0.0069*	-0.0168*	*0.0078*	-0.0897#	*0.0175*	0.0342	*0.0228*	-0.1570#	*0.0075*
INDFIN	0.1515#	*0.0103*	-0.0057	*0.0154*	0.1228#	*0.0293*	0.1254#	*0.0376*	-0.0168	*0.0100*
INDCSV	-0.2595#	*0.0065*	-0.1882#	*0.0071*	-0.1006#	*0.0155*	-0.0512*	*0.0224*	-0.3052#	*0.0078*
REGCAP	0.0630#	*0.0060*	-0.0776#	*0.0077*	-0.3025#	*0.0269*	0.0978#	*0.0358*	-0.0963#	*0.0080*
REGOFS	-0.0520#	*0.0102*	-0.0828#	*0.0099*	-0.4172#	*0.0485*	-	*0.0000*	-0.0376#	*0.0129*
REGTVL	0.1573#	*0.0055*	0.0830#	*0.0061*	0.0627*	*0.0310*	0.4352#	*0.0203*	0.0499#	*0.0072*
RURAL	-0.3035#	*0.0070*	-0.2037#	*0.0069*	-0.1576#	*0.0203*	-0.0988#	*0.0262*	-0.1017#	*0.0126*
CONSTANT	3.2235#	*0.0250*	3.8567#	*0.0275*	3.6322#	*0.0643*	3.2921#	*0.0818*	3.4503#	*0.0686*
Model χ^2	76254#		11014#		5535#		2866#		18980#	

# Denotes significance at the 1% level. * Denotes significance at the 5% level.

TABLE S5. MONTHLY EARNINGS FUNCTIONS BY RACIAL GROUP 1995

| | Racial group | | | | | | | | | |
| | All | | Black | | Coloured | | Asian | | White | |
Variable	Coeff.	*Std. Error*	Coeff.	*Std. Error*	Coeff.	*Std. Error*	Coeff.	*Std. Error*	Coeff.	*Std. Error*
AGE	0.0476#	*0.0065*	0.0435#	*0.0098*	0.0724#	*0.0113*	0.0902#	*0.0169*	0.1239#	*0.0097*
AGESQ	-0.0004#	*0.0001*	-0.0004#	*0.0001*	-0.0008#	*0.0001*	-0.0009#	*0.0002*	-0.0014#	*0.0001*
EDSECO	0.4512#	*0.0301*	0.2593#	*0.0326*	0.3404#	*0.0520*	0.3800#	*0.1087*	0.8844	*0.7968*
EDDIPL	0.6817#	*0.0452*	0.5065#	*0.0550*	0.5639#	*0.0913*	0.9070#	*0.1233*	1.0071	*0.7976*
EDDEGR	0.9514#	*0.0665*	0.8610#	*0.1228*	0.8237#	*0.1989*	0.9623#	*0.1770*	1.2179	*0.7983*
OCCMAN	1.3625#	*0.0496*	0.8906#	*0.1011*	0.8289#	*0.1293*	0.5779#	*0.1527*	0.7857#	*0.1483*
OCCPRO	1.0718#	*0.0691*	0.6406#	*0.1162*	1.0296#	*0.1738*	0.4693*	*0.1905*	0.6300#	*0.1558*
OCCTEC	1.0152#	*0.0396*	0.7224#	*0.0543*	0.9119#	*0.0907*	0.5152#	*0.1444*	0.6006#	*0.1466*
OCCCLE	0.5338#	*0.0383*	0.4723#	*0.0476*	0.5065#	*0.0615*	0.3109*	*0.1422*	0.2113	*0.1540*
OCCSER	0.5306#	*0.0366*	0.3902#	*0.0416*	0.3958#	*0.0646*	0.1533	*0.1507*	0.2952*	*0.1470*
OCCCAT	0.5772#	*0.0345*	0.2938#	*0.0410*	0.4051#	*0.0562*	0.1345	*0.1489*	0.3586*	*0.1453*
OCCSSK	0.3498#	*0.0310*	0.3460#	*0.0351*	0.3591#	*0.0598*	0.1125	*0.1440*	0.1737	*0.1535*
INDEGW	0.1743#	*0.0621*	0.1917*	*0.0804*	0.1526	*0.1415*	0.3733*	*0.1727*	0.0326	*0.0756*
INDCON	-0.2594#	*0.0444*	-0.1913#	*0.0632*	-0.2104#	*0.0625*	-0.1068	*0.1461*	-0.1041	*0.0756*
INDWRT	-0.2443#	*0.0303*	-0.2515#	*0.0415*	-0.1714#	*0.0553*	-0.0764	*0.0798*	-0.2251#	*0.0513*
INDTSC	0.0482	*0.0313*	0.0067	*0.0389*	0.0877	*0.0724*	0.1337	*0.0794*	0.0001	*0.0547*
INDFIN	-0.0488	*0.0397*	-0.1407#	*0.0499*	-0.1437	*0.0782*	-0.0270	*0.1229*	0.0332	*0.0565*
INDCSV	-0.0787#	*0.0305*	-0.0263	*0.0392*	-0.0147	*0.0577*	-0.0029	*0.0905*	-0.0828	*0.0522*
REGCAP	-0.0971#	*0.0358*	-0.1985#	*0.0643*	-0.3929#	*0.0706*	-0.1988*	*0.0917*	-0.1037*	*0.0522*
REGOFS	-0.3049#	*0.0559*	-0.3761#	*0.0491*	-0.5701#	*0.1657*	-	*0.0000*	-0.0621	*0.0643*
REGTVL	0.1247#	*0.0317*	0.0811*	*0.0355*	0.0610	*0.0824*	0.1917*	*0.0813*	0.1401#	*0.0477*
RURAL	-0.2910#	*0.0375*	-0.2251#	*0.0380*	-0.1988	*0.1514*	-0.4839#	*0.1376*	-0.0350	*0.0840*
CONSTANT	5.6150#	*0.1346*	5.8349#	*0.1985*	5.5314#	*0.2410*	5.2044#	*0.3606*	4.4447#	*0.8263*
Model χ^2	1488485#		542869#		178324#		74454#		367312#	

\# Denotes significance at the 1% level. * Denotes significance at the 5% level.

TABLE S6. MONTHLY EARNINGS FUNCTIONS BY RACIAL GROUP 1997

	Racial group									
	All		Black		Coloured		Asian		White	
Variable	Coeff.	*Std. Error*	Coeff.	*Std. Error*	Coeff.	*Std. Error*	Coeff.	*Std. Error*	Coeff.	*Std. Error*
AGE	0.0589#	*0.0062*	0.0730#	*0.0076*	0.0640#	*0.0112*	0.0926#	*0.0160*	0.0887#	*0.0147*
AGESQ	-0.0006#	*0.0001*	-0.0008#	*0.0001*	-0.0007#	*0.0001*	-0.0011#	*0.0002*	-0.0009#	*0.0002*
EDSECO	0.4288#	*0.0266*	0.2914#	*0.0269*	0.2588#	*0.0589*	0.2598	*0.1423*	0.8478	*0.4705*
EDDIPL	0.8826#	*0.0400*	0.7484#	*0.0491*	0.8395#	*0.0900*	0.6231#	*0.1614*	0.9424*	*0.4700*
EDDEGR	1.1289#	*0.0667*	1.0222#	*0.0731*	1.0420#	*0.1153*	0.6327#	*0.1833*	1.1386*	*0.4769*
OCCMAN	0.9559#	*0.0434*	0.6890#	*0.0556*	0.6241#	*0.0783*	0.4054#	*0.1198*	0.4899#	*0.1001*
OCCPRO	0.7585#	*0.0501*	0.5760#	*0.0557*	0.5585#	*0.1018*	0.4022#	*0.1482*	0.4255#	*0.1126*
OCCTEC	0.6929#	*0.0460*	0.5630#	*0.0570*	0.5979#	*0.0709*	0.3007*	*0.1211*	0.2420*	*0.1143*
OCCCLE	0.4038#	*0.0381*	0.3686#	*0.0448*	0.4113#	*0.0696*	0.1191	*0.1175*	-0.0097	*0.1106*
OCCSER	0.3188#	*0.0369*	0.2902#	*0.0412*	0.3831#	*0.0650*	0.3189#	*0.1203*	0.0534	*0.1194*
OCCCAT	0.3150#	*0.0322*	0.2593#	*0.0342*	0.2615#	*0.0544*	-0.0655	*0.1314*	0.0405	*0.1059*
OCCSSK	0.1992#	*0.0307*	0.2810#	*0.0322*	0.2122#	*0.0708*	-0.2340	*0.1336*	-0.1575	*0.1223*
INDEGW	0.0760	*0.0603*	0.1167	*0.0727*	0.0824	*0.0766*	-0.0218	*0.3754*	-0.0655	*0.1145*
INDCON	-0.1519#	*0.0390*	-0.1526#	*0.0422*	-0.0963	*0.0583*	0.1168	*0.1193*	-0.0636	*0.1188*
INDWRT	-0.1851#	*0.0303*	-0.2354#	*0.0345*	-0.1622#	*0.0572*	-0.0548	*0.0783*	-0.1266	*0.0728*
INDTSC	0.0732*	*0.0363*	-0.0518	*0.0345*	0.0450	*0.0895*	0.0290	*0.1206*	0.1239	*0.0744*
INDFIN	0.0307	*0.0418*	-0.1176*	*0.0490*	-0.0389	*0.0865*	0.0691	*0.1014*	0.1699*	*0.0763*
INDCSV	-0.0650*	*0.0287*	-0.0525	*0.0329*	0.0697	*0.0460*	0.0259	*0.0864*	-0.0623	*0.0768*
REGCAP	-0.0903*	*0.0383*	-0.1959#	*0.0403*	-0.4374#	*0.1548*	0.0480	*0.1004*	-0.1254	*0.0954*
REGOFS	-0.3320#	*0.0560*	-0.3495#	*0.0474*	-0.8665#	*0.2364*	0.2756	*0.1424*	-0.2829#	*0.1060*
REGTVL	-0.0493	*0.0336*	-0.0576*	*0.0290*	-0.2675	*0.1622*	0.2007#	*0.0731*	-0.0237	*0.0857*
RURAL	-0.4008#	*0.0296*	-0.2629#	*0.0306*	-0.3888#	*0.1154*	-0.3754#	*0.0753*	-0.2853*	*0.1214*
CONSTANT	5.6531#	*0.1255*	5.4217#	*0.1550*	6.0966#	*0.2609*	5.5419#	*0.3117*	5.5049#	*0.5472*
Model χ^2	1397972#		577695#		160453#		54242#		165290#	

# Denotes significance at the 1% level. * Denotes significance at the 5% level.