

University of Dundee

Dundee Discussion Papers in Economics 157

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Publication date:
2003

[Link to publication in Discovery Research Portal](#)

Citation for published version (APA):

Allanson, P., & Atkins, J. (2003). *Dundee Discussion Papers in Economics 157: Accounting for the persistence of racial wage differences in post-apartheid South Africa*. (Dundee Discussion Papers in Economics; No. 157). University of Dundee.

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Accounting for the Persistence of Racial Wage
Differences in Post- Apartheid South Africa

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Working Paper
No. 157
December 2003
ISSN:1473-236X

Accounting for the Persistence of Racial Wage Differences in Post-Apartheid South Africa

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December 2003

Abstract

This paper employs data from the Labour Force Surveys of September 2000 and 2001 to update our earlier account of the evolution of the racial wage hierarchy in post-apartheid South Africa. We present evidence that the wage position of the majority African workforce improved relative to all other racial groups immediately following the transition to democratic rule in 1994, but that these gains had been largely eroded by 2001. The persistence of racial wage differences following the repeal of all overt discriminatory laws and regulations points to the need for concerted policy interventions to reverse the legacy of apartheid. We review the range of policy initiatives that have been taken by the South African Government since 1994 in the light of our empirical findings.

JEL Codes: J71, J31

1. Introduction

The gradual erosion and final collapse of the apartheid regime has stimulated an active literature on the effects of racial discrimination on the labour market of the Republic of South Africa [see, for example, *Human and Greenacre, 1987; Knight and McGrath, 1987; Moll, 1992, 2000; Treiman et al., 1996; Sherer, 2000; Allanson et al., 2000, 2002; Allanson and Atkins, 2002, Rospabe, 2002*]. In particular, Allanson and Atkins [2002] provide an account of the evolution of the racial wage hierarchy in the South African labour market between 1993 and 1999. This paper employs data from the Labour Force Surveys of September 2000 and 2001 to extend their empirical analysis to cover the opening seven years of the post-apartheid era.

The starting point for the study is the simple observation that South Africa is a multiracial society: the system of apartheid laws recognised four main racial groups, namely Africans/Blacks, Coloureds, Indians/Asians and Whites. The existence of more than two distinct groups raises a general methodological issue of how to analyse the resultant set of wage differentials. The common solution to this problem has been to separately decompose the wage differential between one or more pairings of the groups using standard Oaxaca-Blinder techniques. But if the aim is to provide an exhaustive analysis of the complete set of wage differentials then this pair-wise approach is cumbersome and the results difficult to interpret in the absence of a common specification of the non-discriminatory wage structure. As an alternative, Allanson et al. [2000] propose a multilateral procedure that provides an exact, joint decomposition of the pattern of logarithmic wage differentials between the various groups into explained and residual components. In this paper, we follow Allanson and Atkins [2002] by expressing all the decomposition results in terms of levels of and changes in percentage deviations from the geometric mean wage of either the relevant group or the whole workforce under the hypothesised non-discriminatory wage structure. The interpretation of the resultant

findings is particularly intuitive with a clear identification of the various sources of wage disparities.

The South African apartheid system formally ended with the election of the African National Congress at the first all-race elections held in 1994. Yet, in spite of this political transformation and the subsequent repeal and replacement of apartheid legislation by policies designed to tackle the perceived causes of racial inequality, ‘the overall consequences of the legacy of apartheid are deeply embedded in the polity, society and economy of the country’ [Presidential Commission, 1996]. Figure 1 provides *prima facie* evidence of the persistence of South Africa’s well-known *hierarchical wage structure* over the period 1993 to 2001. It shows that amongst full-time, regular, civilian, non-primary sector, male employees of normal working age, Whites had the highest geometric mean wage, followed by Indians, Coloureds and finally Africans who received the lowest geometric mean wage of any racial group throughout the period. Between 1993 and 1995 the overall African-White wage differential fell but then this gap stagnated or even rose slightly through the latter half of the 1990s. Thus substantial wage disparities persist seven years after the transition to majority democratic rule.

A useful parallel may be drawn here with USA and other international experience even though this 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 labour 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. One possible explanation is put forward by Arrow [1998] who stresses the potential importance both of ‘statistical discrimination’ and of social interactions and networks in influencing behaviour and perpetuating differential treatment. Thus the apartheid policy of residential segregation might

Figure 1. *Geometric Mean Hourly Wages by Racial Group as a Percentage of the Overall Geometric Mean Hourly Wage*

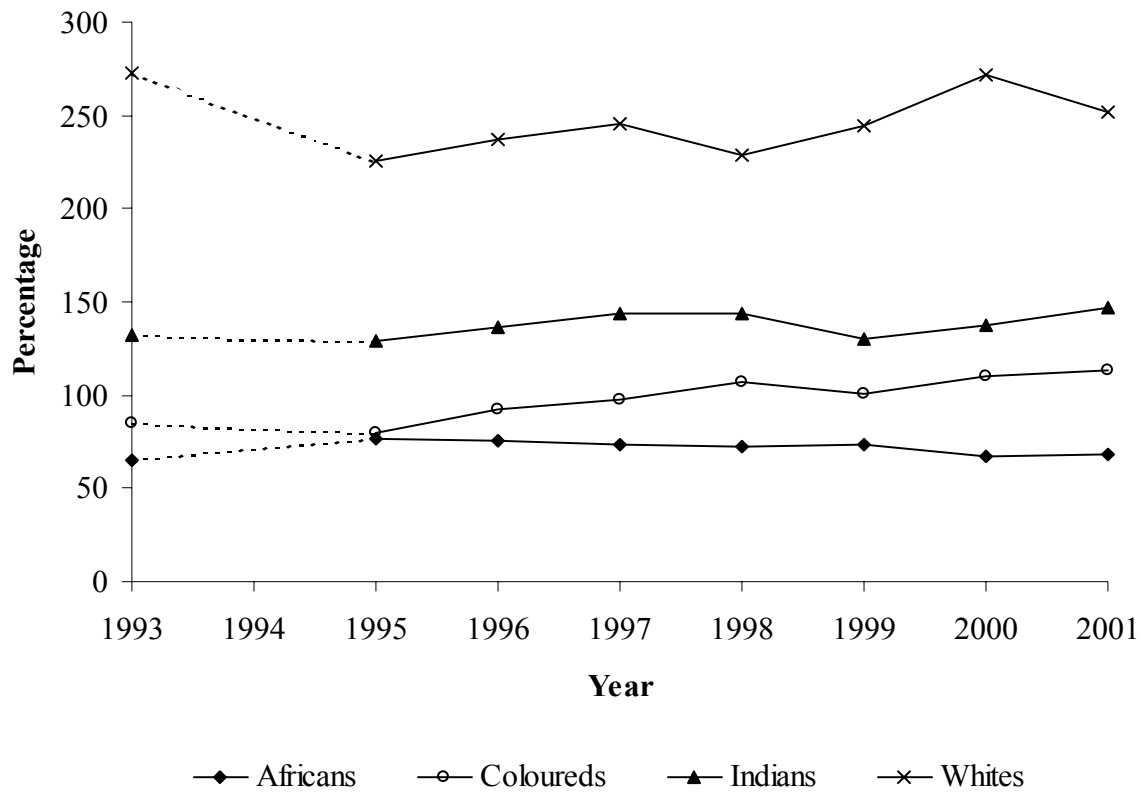
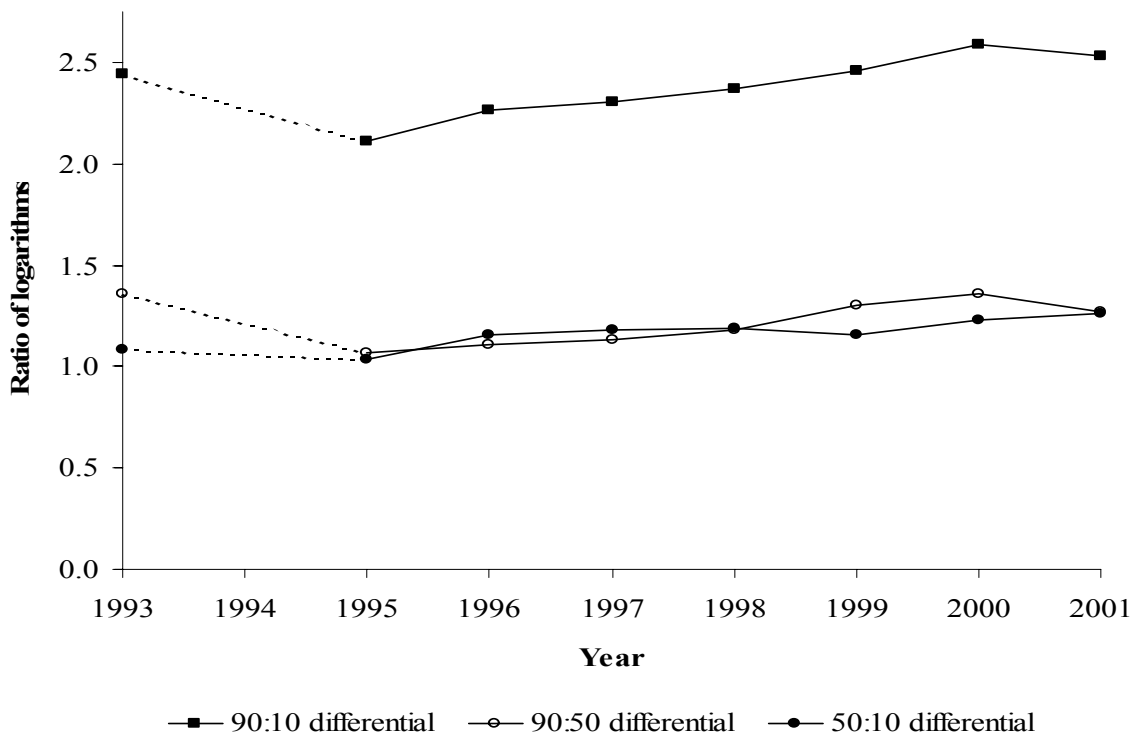


Figure 2. *Overall Log Hourly Wage Differentials*



be expected to have a long-term detrimental impact on the operation of the labour market by inhibiting the formation of a genuinely multiracial society. A second reason may be that previous extra-market discrimination, particularly in the provision of education, can contribute markedly to continuing inequalities in the labour market since disadvantage tends to be self-reproducing and reinforcing. Case and Deaton [1999] find that the educational attainment of African children in South Africa is positively related to both the level of education of the head of the household and the level of household resources. Finally, Juhn et al. [1991, 1993] emphasise the importance of also taking changing returns to skills into account if the distribution of those skills is not uniform across racial groups due to either current discrimination or enduring patterns of disadvantage. In this paper we focus on the extent to which such broader changes in the overall distribution of wages may serve to explain the lack of any sustained convergence in racial wage disparities in the post-apartheid era.

Poswell [2002] argues that the South African economy is characterised by a large excess labour supply and subject to increasing trade liberalisation and globalisation, both of which are likely to have put downward pressure on wages. On the other hand, skill shortages have put upward pressure on the top end of the wage distribution while trade union power may have been effective in maintaining wage levels in some lower paid jobs [see also *Natrass, 2000*]. Figure 2 shows that overall wage inequality amongst full-time, regular, civilian, non-primary sector, male employees of normal working age, as measured by the logarithm of the ratio of the hourly wage rate of the 90th percentile worker to that of the 10th percentile worker, fell between 1993 and 1995 but then grew steadily over the following six years. Between 1995 and 2001 there was a 20 per cent increase in the 90-10 log wage differential as the net result of an 18 per cent rise in the 90-50 differential and a 22 per cent rise in the 50-10 differential. Given that Africans are relatively concentrated in the lower half of the skills distribution, we conjecture that rising

skill prices may provide some part of the explanation for the persistence of racial wage disparities.

The structure of the paper is as follows. The following section sets out the multilateral decomposition procedure that we employ to investigate the changing basis of the racial wage hierarchy. Section 3 outlines the construction and sample characteristics of the data sets employed in the study. Section 4 presents our results on the nature and sources of the evolution of the racial wage hierarchy in the post-apartheid era. In the light of these empirical findings, the final section reviews the range of policy initiatives that have been taken by the South African Government to tackle the legacy of apartheid in the labour market.

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 African, Coloured, Indian and White groups into explained and residual components. The explained component may change over time due to changes in the measured or observed characteristics of the workforce and changes in the returns to such characteristics. Changes in the residual component can similarly arise from changes in the distribution of and returns to unmeasured or unobserved workforce characteristics, but may also reflect variation in the extent of any wage discrimination. We adapt an approach due to Juhn et al. [1991] to seek to identify the potential importance of changes in the returns to unobserved characteristics in the evolution of the residual wage gap.

Multilateral decomposition procedure

Following Oaxaca [1973] and Blinder [1973], the gross difference between the mean

logarithm of wages of racial groups p and q ($p, q \in r = \text{African, Coloured, Indian, White}$) in period t can be decomposed into an explained or predicted difference due to disparities in observed or measured characteristics between the two groups, and an unexplained or residual difference attributable to both wage discrimination and unmeasured disparities in characteristics. Neumark [1988] and Oaxaca and Ransom [1994] formalise this basic decomposition procedure by explicitly writing the residual difference 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 gross and predicted differences in the mean logarithm of wages, to yield the following total decomposition of $\ln(W_{pt} / W_{qt})$:

$$\left\{ \ln\left(\frac{W_{pt}}{W_t}\right) - \ln\left(\frac{W_{qt}}{W_t}\right) \right\} = \left\{ \ln\left(\frac{W_{pt}^*}{W_t^*}\right) - \ln\left(\frac{W_{qt}^*}{W_t^*}\right) \right\} + \left\{ \ln\left(\frac{W_{pt}}{W_{pt}^*}\right) - \ln\left(\frac{W_{qt}}{W_{qt}^*}\right) \right\} \quad \text{for all } p, q \in r; p \neq q \quad (1)$$

where W_{rt} and W_t are respectively the geometric mean wages of group r and the entire workforce under the (observed) discriminatory wage structure, and W_{rt}^* and W_t^* are the corresponding geometric mean wages under the (hypothetical) non-discriminatory wage structure. The main advantage of (1) over the standard Oaxaca-Blinder decomposition is that each component of the equation is expressed as the difference between two terms that is each defined independently of the particular binary comparison that is being made.

The implementation of (1) first requires the specification and estimation of a suitable model of wage determination under both the discriminatory and non-discriminatory regimes. Let the observed wage of an individual worker h in group r in year t be given by a standard Mincerian wage function:

$$\ln w_{rht} = X'_{rht} \beta_{rt} + u_{rht} \quad h=1, \dots, n_{rt}; \quad \text{for all } r \quad (2)$$

where w_{rht} is the wage of the worker, X_{rht} is a vector of observed characteristics associated with

the worker, β_r is a conformable vector of group-specific returns to characteristics and u_{rht} is defined so that $E(u_{rht} | X_{rht}) = 0$. If data on wages consist solely of point observations then estimation of (2) by ordinary least squares (OLS) using the sample of n_{rt} observations on group r workers yields an estimate $\hat{\beta}_r$ such that $\ln W_r = \bar{X}'_r \hat{\beta}_r$ where \bar{X}_r is the vector of mean values of the observed characteristics of group r . Additionally, OLS estimation of (2) over the pooled sample of size $n_t = \sum n_{rt}$ yields the pooled estimate $\hat{\beta}_t$ such that $\ln W_t = \bar{X}'_t \hat{\beta}_t$ where \bar{X}_t is the vector of mean values of the observed characteristics of the entire workforce.

The appropriate specification for the non-discriminatory wage structure is less well established in the literature. We make the strong but conventional assumption that the supply of labour is fixed such that neither the number, identities nor characteristics of workers would change in the absence of discrimination. We further assume that the form of the wage function would be unchanged and specify the non-discriminatory wage function for an individual worker i of any race in year t as:

$$\ln w_{it}^* = X'_{it} \beta_t^* + u_{it}^* \quad i=1, \dots, n_t; \quad n_t = \sum n_{rt} \quad (3)$$

where w_{it}^* is the hypothetical non-discriminatory wage of the worker, X_{it} is a vector of observed characteristics associated with the worker, β_t^* is a conformable vector of non-discriminatory returns to characteristics and u_{it}^* is defined so that $E(u_{it}^* | X_{it}) = 0$. Neumark [1988] provides a theoretical model to support the choice of $\hat{\beta}_t^* = \hat{\beta}_t$, that is the estimate of the non-discriminatory wage structure β_t^* in (3) is obtained by the estimation of (2) over the pooled sample of observations generated by the discriminatory wage regime. Oaxaca and Ransom [1994] show that $\hat{\beta}_t$ can be interpreted as a weighted combination of the $\hat{\beta}_r$ estimates in (2), though individual elements of $\hat{\beta}_t$ need not be bracketed by the corresponding elements of $\hat{\beta}_r$ from the

separately estimated racial wage structures. The crucial point however for our multilateral decomposition procedure is simply that if $\hat{\beta}_t^* = \hat{\beta}_t$, then $\ln \hat{W}_t^* = \ln W_t = \bar{X}'_t \hat{\beta}_t$, that is our estimates of the overall geometric mean wage are identical under the two labour market regimes.

In practice, OLS estimation of (2) will be infeasible if all or some of the observations on wages take the form of interval data. This will be the case if workers were not asked to report their exact wage but only within which of a set of pre-defined wage brackets the amount fell or if some workers were only prepared to respond in this manner. In general, the use of a generalised Tobit estimator [*StataCorp, 1997, Volume 1, p. 145*] will serve to deal with any censoring of the dependent variable while yielding identical results to the OLS estimator in the special case in which all observations on wages are reported as exact amounts. We define $\ln \tilde{W}_{rt} = \bar{X}'_{rt} \tilde{\beta}_{rt}$, $\ln \tilde{W}_t = \bar{X}'_t \tilde{\beta}_t$ and $\ln \tilde{W}_t^* = \bar{X}'_t \tilde{\beta}_t^* = \bar{X}'_t \tilde{\beta}_t$ where tildas refer to the generalised Tobit estimates, such that $\ln \tilde{W}_{rt}$ and $\ln \tilde{W}_t$ are unbiased but not necessarily exact estimators of $\ln W_{rt}$ and $\ln W_t$.

We proceed to obtain estimates of the various terms in the decomposition equation (1) as:

$$\left\{ \ln \left(\frac{\tilde{W}_{rt}}{\tilde{W}_t} \right) \right\} = \ln \tilde{W}_{rt} - \ln \tilde{W}_t = \bar{X}'_{rt} \tilde{\beta}_{rt} - \bar{X}'_t \tilde{\beta}_t \equiv \ln \{ \tilde{\gamma}_{rt} + 1 \} \quad \text{for all } r \quad (4)$$

$$\left\{ \ln \left(\frac{\tilde{W}_{rt}^*}{\tilde{W}_t^*} \right) \right\} = \ln \tilde{W}_{rt}^* - \ln \tilde{W}_t^* = (\bar{X}_{rt} - \bar{X}_t)' \tilde{\beta}_t^* \equiv \ln \{ \tilde{\theta}_{rt} + 1 \} \quad \text{for all } r \quad (5)$$

$$\left\{ \ln \left(\frac{\tilde{W}_{rt}}{\tilde{W}_{rt}^*} \right) \right\} = \ln \tilde{W}_{rt} - \ln \tilde{W}_{rt}^* = \bar{X}'_{rt} (\tilde{\beta}_{rt} - \tilde{\beta}_t^*) \equiv \ln \{ \tilde{\delta}_{rt} + 1 \} \quad \text{for all } r \quad (6)$$

where $\ln \{ \tilde{\gamma}_{rt} + 1 \}$ will exactly equal the sum of $\ln \{ \tilde{\theta}_{rt} + 1 \}$ and $\ln \{ \tilde{\delta}_{rt} + 1 \}$ since $\ln \tilde{W}_t^*$ is equal to $\ln \tilde{W}_t$ by construction. The gross wage differentials $\tilde{\gamma}_{rt}$, predicted wage differentials $\tilde{\theta}_{rt}$ and

unadjusted residual wage differentials or Beckerian ‘discrimination coefficients’ $\tilde{\delta}_{rt}$ constitute a set of sufficient statistics for the multilateral analysis of the racial wage hierarchy. Moreover, if all wage gaps are expressed relative to the (common) overall geometric wage then the gross wage differential $\tilde{\gamma}_{rt}$ will be equal to the sum of the predicted wage differential $\tilde{\theta}_{rt}$ and the adjusted residual wage differential $\tilde{\delta}_{rt}(\tilde{\theta}_{rt} + 1)$:

$$\tilde{\gamma}_{rt} = \frac{\tilde{W}_{rt} - \tilde{W}_t}{\tilde{W}_t} = \tilde{\theta}_{rt} + \tilde{\delta}_{rt}(\tilde{\theta}_{rt} + 1) = \frac{\tilde{W}_{rt}^* - \tilde{W}_t^*}{\tilde{W}_t^*} + \frac{\tilde{W}_{rt} - \tilde{W}_{rt}^*}{\tilde{W}_{rt}^*} \left(\frac{\tilde{W}_{rt}^*}{\tilde{W}_t^*} \right) = \frac{\tilde{W}_{rt}^* - \tilde{W}_t^*}{\tilde{W}_t^*} + \frac{\tilde{W}_{rt} - \tilde{W}_{rt}^*}{\tilde{W}_t^*} \text{ for all } r \quad (7)$$

This makes the interpretation of the results particularly clear and intuitive.

Decomposition of changes in racial wage differentials over time

The decomposition of changes in racial wage differentials over time is complicated by the possibility that changes in the residual wage gap can result either from changes in wage discrimination or from changes in the distribution of and returns to unmeasured or unobserved characteristics in the workforce or from some combination of the two. The standard methodology for decomposing wage changes between groups over time [Altonji and Blank, 1999] is based on the assumption that any change in the residual wage gap is due to changes in wage discrimination and thus attributes the whole of the change in wage differentials to changes in observed characteristics and the returns to those characteristics. In the case of our multilateral procedure, this assumption yields the following decompositions of the changes in the gross, predicted and unadjusted residual wage differentials for each group r between years t and t' :

$$\tilde{\gamma}_{rt'} - \tilde{\gamma}_{rt} = (\tilde{\theta}_{rt'} - \tilde{\theta}_{rt}) + (\tilde{\delta}_{rt'}(\tilde{\theta}_{rt'} + 1) - \tilde{\delta}_{rt}(\tilde{\theta}_{rt} + 1)) \text{ for all } r \quad (8)$$

$$\tilde{\theta}_{rt'} - \tilde{\theta}_{rt} = (\exp(\Delta\bar{X}'_{rt'}\tilde{\beta}_t^*) - \exp(\Delta\bar{X}'_{rt}\tilde{\beta}_t^*)) + (\exp(\Delta\bar{X}'_{rt'}\tilde{\beta}_{t'}^*) - \exp(\Delta\bar{X}'_{rt}\tilde{\beta}_{t'}^*)) \text{ for all } r \quad (9)$$

and:

$$\tilde{\delta}_{rt'} - \tilde{\delta}_{rt} = \left(\exp(\bar{X}'_{rt'} \Delta \tilde{\beta}_{rt'}) - \exp(\bar{X}'_{rt} \Delta \tilde{\beta}_{rt}) \right) + \left(\exp(\bar{X}'_{rt'} \Delta \tilde{\beta}_{rt'}) - \exp(\bar{X}'_{rt} \Delta \tilde{\beta}_{rt'}) \right) \text{ for all } r \quad (10)$$

where $\Delta \bar{X}_{rs} = \bar{X}_{rs} - \bar{X}_s$ ($s \in t, t'$) is the difference in observed characteristics between the average group r and overall average worker and $\Delta \tilde{\beta}_{rs} = \tilde{\beta}_{rs} - \tilde{\beta}_s^*$ ($s \in t, t'$)¹ is the difference between the discriminatory and non-discriminatory returns to observed characteristics faced by group r workers. Hence that part of the change in the gross wage differential predicted by the model of wage determination is given in (9) as the sum of the effects of the change in the difference in observed characteristics given the non-discriminatory wage structure in year t and the change in the non-discriminatory returns to observed characteristics given the difference in observed characteristics in year t' . Whereas the change in the ‘discrimination coefficient’ in (10) is equal to the sum of the effects of the change in the difference in returns to observed characteristics given the average characteristics of group r workers in year t and the change in the observed characteristics of the average group r worker given the difference in returns to observed characteristics in year t' .

However, Juhn et al. [1991] argue that the standard approach may give a misleading impression of the change in wage discrimination over the period since part of the change in the residual component may be due to changes either in the racial distribution of unobserved characteristics within the workforce or in the returns to those characteristics. In particular, if returns to unobserved characteristics increase then this will lead to apparent increases in discrimination against those groups over-represented in the lower end of the residual wage distribution due to inferior unobserved characteristics and in favour of those groups with superior unobserved characteristics. To seek to isolate the potential size of any such effect, Juhn et al. [1991] devise a decomposition procedure based on the assumption that the residual component is entirely due to differences in unobserved characteristics. This assumption may not be that

implausible in the South African context: Van der Berg [2001] argues that if account were taken in earning functions of the large variations in educational quality then the residual role for labour market race discrimination in explaining earnings differential might well be small.

We are unable to substantiate Van der Berg's contention given the available data on educational provision by race. However we do construct an alternative decomposition of the change in the unadjusted residual wage differential in (10) that provides a measure which may be interpreted as the change in returns to unobserved characteristics if residual wage differences are entirely due to disparities in unobserved characteristics and the overall distribution of such characteristics is constant over time. If these conditions were to hold then the model of wage determination would be given by (3) and, following Juhn et al. [1991], we can write $u_{it}^* = \varepsilon_{it}\sigma_t$ where ε_{it} is a 'standardised' disturbance term (with a mean of zero and a variance of one) that may be interpreted as a measure of unobserved characteristics and the residual standard deviation of wages σ_t is interpreted as the return to those characteristics in year t . Using this notation (4) may be re-written as:

$$\ln\{\tilde{\gamma}_{rt} + 1\} = \ln\tilde{W}_{rt} - \ln\tilde{W}_t^* = (\bar{X}'_r - \bar{X}'_t)\tilde{\beta}_t^* + (\tilde{\varepsilon}_{rt} - \tilde{\varepsilon}_t)\tilde{\sigma}_t = (\bar{X}'_r - \bar{X}'_t)\tilde{\beta}_t^* + \Delta\tilde{\varepsilon}_{rt}\tilde{\sigma}_t \text{ for all } r \quad (11)$$

where the first equality holds by assumption, $\tilde{\varepsilon}_{rt}$ and $\tilde{\varepsilon}_t$ are respectively the group r and overall average standardised regression residuals from the pooled regression (3), and $\Delta\tilde{\varepsilon}_{rt} = \tilde{\varepsilon}_{rt}$ since $\tilde{\varepsilon}_t = 0$ by construction. Accordingly, the change in the unadjusted residual wage differential can be re-written from (10) as:

$$\tilde{\delta}_{rt'} - \tilde{\delta}_{rt} = (\exp(\Delta\tilde{\varepsilon}_{rt'}\tilde{\sigma}_t) - \exp(\Delta\tilde{\varepsilon}_{rt}\tilde{\sigma}_t)) + (\exp(\Delta\tilde{\varepsilon}_{rt'}\tilde{\sigma}_{t'}) - \exp(\Delta\tilde{\varepsilon}_{rt}\tilde{\sigma}_t)) \text{ for all } r \quad (12)$$

where the decomposition parallels that of the change in the predicted wage differential in (9). Thus the change in the unadjusted residual wage differential is equal to the sum of the effects of

the change in difference in unobserved characteristics given the returns to those characteristics in year t and the change in returns to unobserved characteristics given the difference in characteristics in year t' . Implementation of (12) first requires the imputation of residuals for those observations with interval wage data: we calculate a point estimate of the residual as the expected value of the residual conditional on the predicted wage for that observation. Computation of $\tilde{\varepsilon}_t \tilde{\sigma}_t$ and $\tilde{\varepsilon}_{t'} \tilde{\sigma}_{t'}$ is then straightforward while $\tilde{\varepsilon}_{t'} \tilde{\sigma}_t$ may be calculated as the average of the group r residuals that would have been observed in year t if group r workers had held the same positions in the year t residual wage distribution that they had held in the year t' residual wage distribution. The latter procedure suggests the alternative interpretation of (12) as the sum of the effects of the movement of group r workers within the overall distribution of unobserved characteristics holding the returns to those characteristics constant and the change in the returns to unobserved characteristics holding the distribution of group r workers within the overall distribution of unobserved characteristics constant.

3. Data

The data for the study are drawn from the 1993 Project for Statistics on Living Standards and Development (PSLSD) survey, the October Household Surveys (OHSs) conducted annually between 1995 and 1999,² and the Labour Force Surveys (LFSs) of September 2000 and 2001. The PSLSD survey was undertaken by the Southern Africa Labour and Development Research Unit [*SALDRU, 1994*] during the nine months leading up to the country's first democratic elections at the end of April 1994 and provides data on the characteristics and employment conditions of individual workers drawn from a representative sample of nearly 9000 households covering the whole of South Africa. The OHSs and LFSs were conducted by Statistics South Africa [*Stats SA, various years; Stats SA, 2001*] and are based on representative probability

samples of between 16000 and 30000 households. Prior to the introduction of the LFS in January 2000, the OHS was the only source of official data on the hours and earnings of individual workers in South Africa.

For our analysis of racial wage rate differentials we initially restricted the sample to men between the ages of 15 and 65 who were in full-time, regular employment in any economic activity other than agriculture forestry and fishing, mining and quarrying, and the armed services. We excluded female, elderly, part-time and casual workers on the grounds that these categories of workers might face discrimination on the basis of gender, age and employment status, which could bias our estimates of the extent of racial wage discrimination. Workers in the agricultural and mining sectors are excluded due to enumeration inconsistencies caused by changes in OHS coverage and sampling methodology. Finally, South African Defence 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 gross hourly wages and for which no data were missing on the common set of independent variables specified in the wage functions. Information on total pay or salary in main employment is reported only in exact terms in the PSLSD, only within pre-specified intervals in the 1996 OHS and as a mixture of point and interval observations in all the other data sources. Gross hourly wage rates were calculated by converting this reported gross pay data to a weekly basis and dividing by hours worked in the past seven days. However, neither the PSLSD nor the OHS surveys are ideally suited for this purpose because the only information on hours worked relate to the total hours worked by an individual in all economic activities not just in main employment.. To enhance 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, or could be identified as being engaged in economic activities other than their main job, or had reported earnings on a daily basis. The surveys also provide comparable data on various worker and job

attributes, including age, educational attainment, region of residence, occupation, industry and trade union membership, which are used to specify a common set of determinants of the wage function.

Finally, we sought to clean the data of any outliers which may give rise to grossly influential observations. Of particular concern were apparent clerical errors in the data for some observations on wages and hours worked. For example, in the 1999 OHS there are the cases of a African bricklayer and a White manager both in the construction industry who are respectively reported as earning R5 per month for a 45 hour week and R600035 per month for a 42 hour week. To identify such cases we adopted a procedure proposed by Hadi and Simonoff [1993] for the identification of multiple outliers in linear regression data, which is relatively resistant to both masking and swamping effects and does not require the number of potential outliers to be arbitrarily set in advance. To implement this procedure we again needed to impute the values of residuals for those observations with interval wage data, by calculating a point estimate for each such observation as the expected value of the residual conditional on the predicted wage. Specifying a 5 per cent significance level, we found 2.02 per cent of outliers in the PSLSD data but no more than 0.55 per cent in any OHS or LFS data set and less than 0.10 per cent in the 1995, 1996 and 1997 OHS and September 2001 LFS data sets. The final cleaned samples varied in size from 2228 observations in the PSLSD data to 9728 in the 1995 OHS data.

The size of the workforce covered by our cleaned samples increased from 2.40 million workers in 1993 to 3.25 million in 1995, and then fluctuated between 2.30 and 3.0 million workers throughout the remainder of the period. The first set of supplementary tables in the Appendix present descriptive statistics for these raised samples. These show that the proportion of Whites fell by nearly 5 percentage points in the years following the end of apartheid, with offsetting increases in the representation of all other racial groups: by 2001, the racial composition of the covered workforce was 61 per cent African, 12 per cent Coloured, 7 per cent

Indian and 20 per cent White. The educational background of the racial groups differs markedly with 70 per cent of White workers, 50 per cent of Indians and less than 20 per cent of Africans and Coloureds having completed at least a secondary education in 1993: indeed more than 20 percent of Coloureds and 40 per cent of Africans had no more than a primary education in that year. Such racial 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 Africans. 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 is inevitably slow given both the low rate of turnover of the labour force and the perpetuation of disadvantage caused by household financial constraints to participation in education: more than 25 per cent of the workers in 1995 who were in the age range 15 to 24 and had not obtained Standard 10 reported that they wished to continue with their education but did not have enough money to do so. Members of all racial groups participated in all occupations and sectors within the highly diversified economy. But the relatively low levels of education received by African and Coloured workers was reflected in a marked over-representation of African and Coloured workers in unskilled and semi-skilled occupational groups as compared to Indians and Whites who were more likely to work in white-collar occupations. However, the proportion of African and Coloured employment in white-collar jobs has more than doubled since the end of apartheid, particularly due to a greater presence in education and other public sector activities. More than 40 per cent of the workforce were trade union members in 1995, with membership rates somewhat higher among Africans and Coloureds than among Indians and Whites throughout the period. Finally, the raised sample statistics reveal particular regional concentrations of Indians in Kwazulu/Natal and of Coloureds in Western Cape, surrounding Cape Town, with far more uniform distributions of Whites and

Africans. These distributions strongly reflect historic settlement patterns and the influence of legislation, such as the Group Areas Act 1950.

4. Multilateral Decomposition of the Racial Wage Hierarchy

Table 1 presents basic summary statistics on the *hierarchical wage structure* for the raised samples. It shows that Whites had the highest geometric mean wage, followed by Indians, Coloureds and finally Africans who received the lowest geometric mean wage of any racial group throughout the period. Following the transition to democratic rule, geometric mean wages initially rose for all groups except Whites, but then stagnated for a number of years prior to the resumption of overall wage growth at the end of the 1990s. This section provides an analysis of the evolving pattern of racial wage disparities.

Table 1. *Geometric Mean Hourly Wages by Racial Group*

	Racial group				
	All races	African	Coloured	Indian	White
	Rand/hr				
1993	8.60	5.61	7.32	11.38	23.46
1995	10.01	7.69	7.94	12.89	22.53
1996	9.60	7.24	8.87	13.05	22.78
1997	9.48	6.94	9.24	13.62	23.23
1998	9.66	6.96	10.37	13.86	22.11
1999	10.92	8.01	10.96	14.20	26.73
2000	11.25	7.52	12.44	15.43	30.54
2001	11.60	7.96	13.08	17.00	29.22

Source: Authors' estimates from wage function regressions.

The practical implementation of the decomposition procedures requires the prior specification and estimation of the wage function for each racial group and for all groups together in each year. The second set of supplementary tables in the Appendix present these wage function estimates. To facilitate the subsequent analysis, the log of the hourly wage was specified in each wage regression as a function of an identical set of explanatory variables: age,

age squared, years of primary, secondary, diploma and university education, occupational category, economic sector, trade union membership and region of residence. One potentially serious omission from the list of explanatory variables is a proxy for the quality of education received by workers due to a lack of suitable data: the OHSs and LFSs provide no information on educational provision while that which is available from the PSLSD is seriously deficient in a number of respects [see *Case and Deaton, 1999*]. However, it should be noted that to the extent that the level of educational attainment is determined by educational quality [*Case and Deaton, 1999*] then the estimated wage functions may be expected to capture at least some of the effects due to the unobserved variation in educational quality.

Estimation of the wage functions is based on samples of full-time, regular, civilian employees working outwith the primary sector and therefore may be subject to sample selection bias. Mwabu and Schultz [2000], in their study of the South African labour market based on the PSLSD data set, have previously sought to identify the selection into full-time regular employment from a combination of land use rights and financial asset variables and found negligible sample selection bias. However, both the PSLSD and the other data sets contain a broader set of variables that the labour economics literature might suggest were of relevance in the determination of employment status. We therefore sought to model sample selection not only as a function of individuals' age, education and region of residence, but also of their marital status, position within the household, health status, disability status, housing tenure and type, and access to farmland. In all cases, both the full set of explanatory variables and the sub-set of identifying variables were jointly significant in the individual probit equations. We also found the Heckman selection correction variables obtained from the probit equations to be significant in a number of the wage function regressions. But, the resultant coefficient estimates of the wage functions were not robust due to severe collinearity problems caused by the inclusion of the Heckman variable: condition numbers of the augmented data matrices were calculated and

found to be greatly in excess of the recommended maximum of 20 [Leung and Yu, 1996]. All the results reported here are therefore based on estimates of the wage functions conditional on sample selection.

For estimation, we used a generalised Tobit estimator [StataCorp, 1997] to deal with the mixture of point and interval data on the dependent variable in the wage functions. Observations were weighted to reflect projections of population size based on the 1991 Census in the case of the PSLSD and on the 1996 Census, as adjusted by a post-enumeration survey, in the case of all of the other data sets. Heteroscedastic-consistent standard errors were calculated that allow for the clustering of the samples, with the EA identified as the PSU. However we did not allow for the stratification of the samples as the data do not enable the explicit identification of stratum in all years. This failure to take the complex sample design fully into account may be expected to have given rise to needlessly large estimates of the standard errors. Nevertheless, many of the coefficients were individually significant at the 5 per cent level or higher, with signs generally conforming to expectations. And the overall fit of the wage function regressions as measured by the χ^2 statistic was highly significantly different from zero in all regressions.

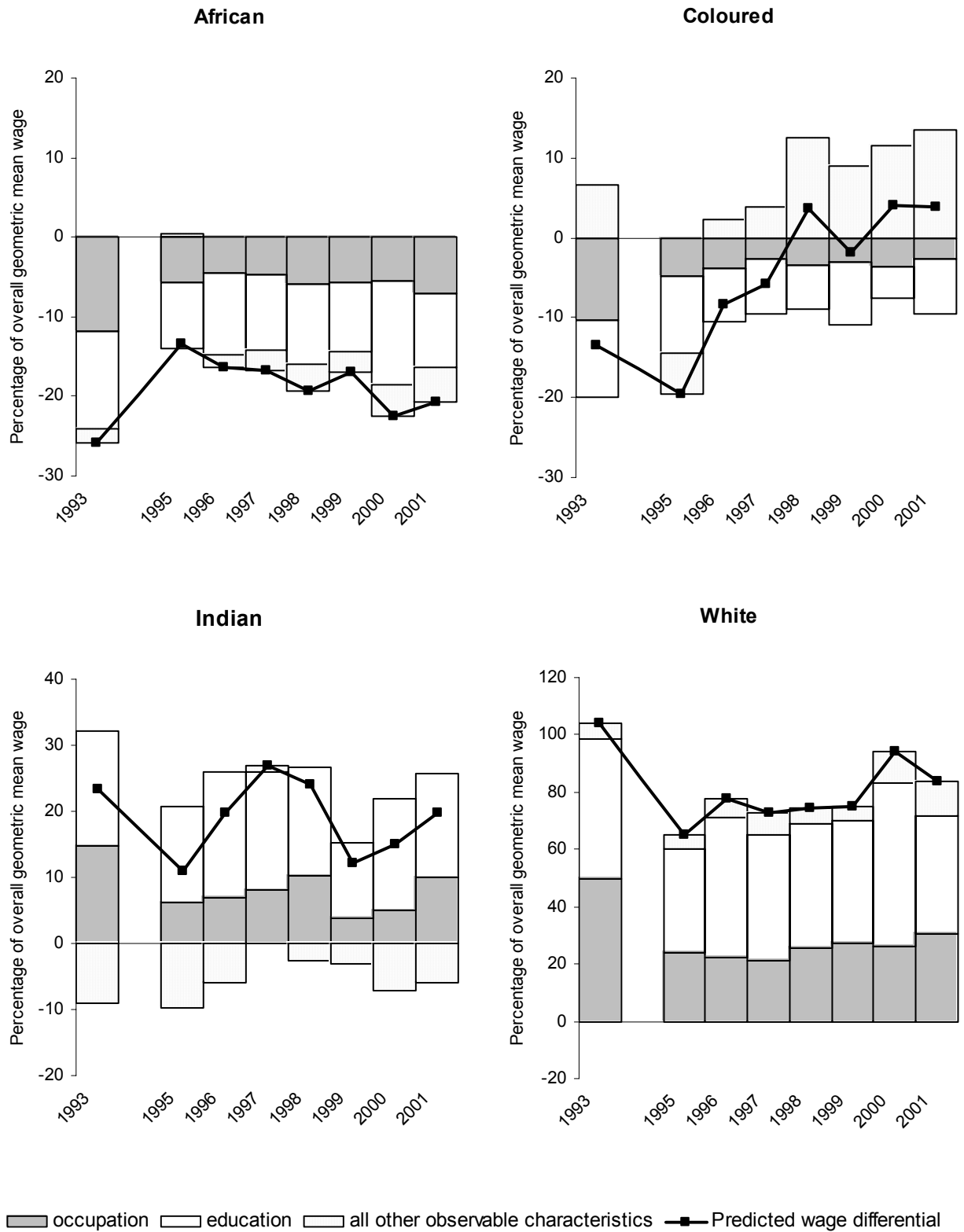
Table 2 presents the results from the multilateral decomposition analysis based on the estimated wage functions. The main part of the table expresses the gross, predicted and adjusted residual wage gaps relative to the (common) overall geometric mean wage in each year. Thus the typical African, Coloured, Indian and White worker of 1993 earned 35 per cent less, 15 per cent less, 32 per cent more and 173 per cent more respectively than the overall geometric wage rate of R8.65 per hour paid to the overall average worker in that year. These gross wage differentials can largely be explained by the specified differences between the various racial groups, and more particularly by racial disparities in educational and occupational attainment which Figure 3 shows account for the bulk of the predicted wage gaps of all four races.³ Taking all observed characteristics into account, the typical African, Coloured, Indian and White worker

Table 2. *Multilateral Decomposition of Hourly Wage Differentials by Racial Group*

	Racial Group			
	African	Coloured	Indian	White
<i>Percentages of overall geometric mean wage</i>				
Gross wage differential $\tilde{\gamma}_r$				
1993	-34.79# (1.50)	-14.83# (4.88)	32.30# 5.60)	172.80# (10.96)
1995	-23.23# (0.57)	-20.71# (1.65)	28.73# (3.48)	125.06# (3.20)
1996	-24.60# (1.07)	-7.62* (3.56)	35.97# (6.10)	137.21# (6.50)
1997	-26.79# (0.69)	-2.58 (1.97)	43.65# (4.82)	144.98# (4.95)
1998	-27.89# (1.30)	7.36 (5.08)	43.45# (7.21)	128.88# (7.57)
1999	-26.67# (0.87)	0.37 (2.82)	29.94# (6.40)	144.70# (1.77)
2000	-33.20# (0.67)	10.53# (2.74)	37.11# (6.37)	171.40# (5.50)
2001	-31.34# (0.77)	12.77# (2.60)	46.59# (5.16)	151.89# (7.11)
Predicted wage differential $\tilde{\theta}_r$				
1993	-25.85# (0.76)	-13.41# (3.11)	23.30# (4.55)	103.92# (4.64)
1995	-13.41# (0.36)	-19.51# (1.15)	11.06# (1.69)	64.92# (1.47)
1996	-16.37# (0.60)	-8.32# (2.01)	19.86# (3.88)	77.92# (2.95)
1997	-16.72# (0.38)	-5.74# (1.43)	26.88# (2.32)	72.76# (2.01)
1998	-19.42# (0.74)	3.67 (3.00)	24.03# (3.94)	74.49# (3.07)
1999	-17.02# (0.45)	-1.80 (1.71)	12.14# (2.74)	75.00# (2.50)
2000	-22.51# (0.42)	3.98* (1.72)	14.96# (2.05)	94.03# (2.64)
2001	-20.71# (0.42)	3.80* (1.92)	19.81# (1.91)	83.91# (2.35)
Adjusted residual wage differential $\tilde{\delta}_r(\tilde{\theta}_r + 1)$				
1993	-8.94# (1.10)	-1.42 (3.83)	9.00 (6.57)	68.88# (8.51)
1995	-9.82# (0.51)	-1.20 (1.38)	17.67# (3.46)	60.14# (3.12)
1996	-8.23# (0.72)	0.70 (2.63)	16.11* (6.94)	59.30# (5.95)
1997	-10.07# (0.55)	3.16 (1.76)	16.78# (4.81)	72.22# (4.73)
1998	-8.48# (1.01)	3.69 (3.84)	19.42* (7.60)	54.39# (6.69)
1999	-9.65# (0.75)	2.16 (2.45)	17.81# (6.12)	69.70# (5.98)
2000	-10.69# (0.60)	6.55* (2.56)	22.16# (5.03)	77.37# (5.61)
2001	-10.63# (0.73)	8.97# (2.44)	26.78# (5.00)	67.97# (5.83)
<i>Percentage of group-specific geometric mean non-discriminatory wage</i>				
Unadjusted residual wage differential $\tilde{\delta}_r$				
1993	-12.06# (1.51)	-1.64 (4.42)	7.30 (5.48)	33.78# (4.25)
1995	-11.34# (0.58)	-1.50 (1.71)	15.91# (3.18)	36.46# (1.98)
1996	-9.84# (0.88)	0.76 (2.87)	13.44* (6.01)	33.33# (3.38)
1997	-12.09# (0.66)	3.35 (1.88)	13.22# (3.85)	41.81# (2.78)
1998	-10.52# (1.26)	3.56 (3.71)	15.66* (6.32)	31.17# (3.89)
1999	-11.63# (0.90)	2.20 (2.50)	15.88# (5.53)	39.83# (3.73)
2000	-13.80# (0.77)	6.30* (2.49)	19.27# (4.32)	39.88# (2.98)
2001	-13.41# (0.92)	8.64# (2.40)	22.35# (4.24)	36.96# (3.07)

Notes: Standard errors in parenthesis are computed by linearization of the relevant statistic around the estimated wage function parameter values. # Indicates significance at the 1 per cent level. * Indicates significance at the 5 per cent level.

Figure 3. Contribution of racial disparities in occupational, educational and all other observable characteristics to predicted wage differentials



of 1993 would have earned 26 per cent less, 13 per cent less, 23 per cent more and 104 per cent more respectively than the typical worker under the hypothetical, non-discriminatory wage structure in that year. The remainder of the gross wage differentials are then accounted for by the adjusted residual wage differentials which allow both for disparities in unobserved characteristics and for any wage discrimination.

Changes over time in the pattern of the gross wage differentials point to two distinct sub-periods in the evolution of the wage hierarchy. The first sub-period between 1993 and 1995 is marked by significant compression of the overall wage hierarchy together with a slight degree of polarisation between the wage rates of Africans and Coloureds on the one hand and those of Indians and Whites on the other. The most noticeable result is a fall in the African-White wage gap from 208 per cent to 148 per cent of the overall geometric mean wage which is due to both the improvement in the relative position of Africans and the deterioration in that of Whites. In addition, the Coloured-Indian wage gap rose slightly from 47 per cent to 49 per cent of the overall geometric mean wage while both the African-Coloured and Indian-White wage gaps fell significantly. The subsequent sub-period from 1995 through 2001 shows some reversal in these trends. In particular, there is a partial reversal of the reduction in the African-White wage gap and the wage position of Coloureds is transformed to such an extent that the typical Coloured worker earned more rather than less than the overall geometric mean wage by 2001. Thus the transition to democratic rule in 1994 was accompanied by an improvement in the wage position of the majority African workforce relative to all other racial groups, but these gains have been largely eroded in the ensuing years of the post-apartheid era.

Tables 3 and 4 present the results from the decomposition of the changes in the racial wage differentials over time. Note that all of the changes are measured relative to a common base year t of 1993 and thus may be interpreted loosely as cumulative changes from the end of the apartheid regime to the specified date. Table 3 shows that the changes in the wage hierarchy

Table 3. *Decomposition of changes in wage differentials since 1993*

Base year 1993	Racial Group							
	African		Coloured		Indian		White	
<i>Change in percentages of overall geometric mean wage</i>								
Change in gross wage differential $\tilde{\gamma}_r$ by:-								
	1995	11.57# (1.60)	-5.88 (5.15)	-3.58 (6.59)	-47.74# (11.42)			
	1996	10.19# (1.84)	7.22 (6.04)	3.66 (8.28)	-35.59# (12.74)			
	1997	8.00# (1.65)	12.26* (5.26)	11.35 (7.39)	-27.82* (12.03)			
	1998	6.90# (1.98)	22.19# (7.05)	11.14 (9.13)	-43.92# (13.32)			
	1999	8.13# (1.73)	15.20# (5.64)	-2.36 (8.51)	-28.10* (11.10)			
	2000	1.59 (1.64)	25.36# (5.60)	4.81 (8.48)	-1.40 (12.27)			
	2001	3.45* (1.68)	27.60# (5.53)	14.28 (7.62)	-20.91 (13.06)			
Change in predicted wage differential $\tilde{\theta}_r$ by:-								
	1995	12.44# (0.84)	-6.10 (3.31)	-12.24* (4.85)	-39.00# (4.86)			
	1996	9.48# (0.97)	5.10 (3.71)	-3.44 (5.98)	-26.01# (5.49)			
	1997	9.13# (0.85)	7.68* (3.42)	3.57 (5.11)	-31.17# (5.05)			
	1998	6.44# (1.06)	17.08# (4.32)	0.73 (6.02)	-29.43# (5.56)			
	1999	8.83# (0.88)	11.62# (3.55)	-11.17* (5.31)	-28.93# (5.27)			
	2000	3.34# (0.87)	17.39# (3.56)	-8.35 (4.99)	-9.90 (5.33)			
	2001	5.14# (0.87)	17.21# (3.66)	-3.50 (4.93)	-20.01# (5.20)			
due to changes in:-								
observed	1995	9.05# (0.17)	-0.60# (0.15)	-9.36# (0.40)	-27.05# (1.46)			
characteristics	1996	6.78# (0.15)	6.59# (0.25)	3.20# (0.37)	-11.45# (1.27)			
	1997	6.33# (0.21)	6.05# (0.22)	7.79# (0.72)	-11.20# (2.06)			
	1998	4.80# (0.18)	9.44# (0.34)	8.16# (0.65)	-12.26# (1.53)			
	1999	7.58# (0.15)	4.45# (0.19)	-9.37# (0.39)	-12.52# (1.34)			
	2000	4.34# (0.14)	9.44# (0.35)	-5.58# (0.39)	-9.08# (1.39)			
	2001	5.92# (0.15)	11.55# (0.42)	-2.47# (0.32)	-19.87# (1.45)			
of which due to changes in:-								
age		-0.30# (0.11)	-0.03 (0.13)	1.95# (0.21)	0.97# (0.33)			
education		3.76# (0.15)	2.94# (0.22)	-3.26# (0.38)	-11.21# (0.73)			
occupation		2.91# (0.13)	6.91# (0.37)	-1.29* (0.57)	-11.11# (0.58)			
industry		0.07 (0.16)	1.58# (0.33)	2.92# (0.57)	-2.03* (0.89)			
region		-0.08 (0.11)	1.31# (0.22)	-0.09 (0.41)	0.31 (0.42)			
trade union membership		-0.44# (0.06)	-1.17# (0.15)	-2.69# (0.34)	3.20# (0.39)			
returns to	1995	3.39# (0.40)	-5.50# (1.25)	-2.89 (1.78)	-11.95# (2.15)			
observed	1996	2.70# (0.63)	-1.49 (2.03)	-6.65 (4.02)	-14.56# (3.53)			
characteristics	1997	2.81# (0.45)	1.63 (1.45)	-4.22 (2.66)	-19.97# (3.25)			
	1998	1.64* (0.77)	7.64* (3.00)	-7.44 (4.15)	-17.17# (3.75)			
	1999	1.26# (0.48)	7.17# (1.74)	-1.80 (2.81)	-16.41# (3.17)			
	2000	-1.00* (0.47)	7.96# (1.72)	-2.77 (2.16)	-0.82 (3.29)			
	2001	-0.79 (0.46)	5.67# (1.92)	-1.03 (2.06)	-0.14 (2.89)			
Change in adjusted residual wage differential $\tilde{\delta}_r(\tilde{\theta}_r + 1)$ by:-								
	1995	-0.88 (1.21)	0.21 (4.07)	8.67 (7.42)	-8.74 (9.07)			
	1996	0.71 (1.32)	2.12 (4.65)	7.11 (9.55)	-9.58 (10.38)			
	1997	-1.13 (1.23)	4.58 (4.21)	7.78 (8.14)	3.35 (9.74)			
	1998	0.46 (1.49)	5.11 (5.42)	10.42 (10.05)	-14.49 (10.83)			
	1999	-0.71 (1.33)	3.58 (4.54)	8.81 (8.98)	0.83 (10.40)			
	2000	-1.75 (1.25)	7.97 (4.60)	13.16 (8.28)	8.50 (10.19)			
	2001	-1.69 (1.32)	10.39* (4.54)	17.78* (8.26)	-0.90 (10.31)			

Notes: Standard errors in parenthesis are computed by linearization of the relevant statistic about the estimated wage function parameter values. # Indicates significance at the 1 per cent level. * Indicates significance at the 5 per cent level.

Table 4. *Decomposition of changes in the unadjusted residual wage differential since 1993:*
(A) in terms of changes in the levels of and returns to observed characteristics
(B) in terms of changes in the levels of and returns to unobserved characteristics

Base year 1993	Racial Group							
	African		Coloured		Indian		White	
<i>Change in percentages of overall geometric mean wage</i>								
Change in unadjusted residual wage differential $\tilde{\delta}_i$ by:-								
	1995	0.72 (1.62)	0.14 (4.74)	8.61 (6.33)	2.69 (4.69)			
	1996	2.22 (1.75)	2.40 (5.27)	6.14 (8.13)	-0.45 (5.43)			
	1997	-0.03 (1.65)	4.99 (4.81)	5.92 (6.70)	8.03 (5.08)			
	1998	1.54 (1.97)	5.20 (5.77)	8.36 (8.36)	-2.61 (5.76)			
	1999	0.43 (1.76)	3.84 (5.08)	8.58 (7.78)	6.06 (5.65)			
	2000	-1.74 (1.69)	7.94 (5.07)	11.97 (6.98)	6.10 (5.19)			
	2001	-1.34 (1.77)	10.28* (5.03)	15.05* (6.93)	3.18 (5.24)			
(A) due to changes in:-								
returns to	1995	3.83* (1.51)	1.90 (4.42)	6.06 (5.51)	-3.46 (4.83)			
observed	1996	5.37# (1.51)	3.72 (4.42)	12.76* (5.60)	1.27 (4.40)			
characteristics	1997	1.81 (1.51)	9.70* (4.43)	-0.50 (5.49)	8.68* (4.42)			
	1998	4.54# (1.51)	6.41 (4.43)	12.61* (5.63)	2.97 (4.42)			
	1999	4.04# (1.51)	7.61 (4.43)	30.98# (6.66)	1.42 (4.92)			
	2000	3.06* (1.51)	14.06# (4.44)	7.50 (5.55)	17.96# (4.55)			
	2001	3.06* (1.51)	17.93# (4.44)	16.21# (5.56)	2.46 (4.39)			
observed	1995	-3.11# (0.63)	-1.76 (1.70)	2.55 (2.86)	6.15* (2.74)			
characteristics	1996	-3.15# (0.94)	-1.32 (2.82)	-6.62 (5.21)	-1.71 (2.56)			
	1997	-1.84* (0.73)	-4.72# (1.73)	6.42 (3.65)	-0.65 (2.09)			
	1998	-3.00* (1.35)	-1.21 (3.57)	-4.25 (5.26)	-5.58 (2.91)			
	1999	-3.60# (0.98)	-3.77 (2.37)	-22.40# (4.44)	4.63 (3.25)			
	2000	-4.80# (0.83)	-6.12# (2.24)	4.48 (4.08)	-11.86# (2.06)			
	2001	-4.40# (1.00)	-7.66# (2.10)	-1.15 (3.86)	0.73 (2.33)			
(B) due to changes in:-								
returns to	1995	1.40 (~)	0.18 (~)	-2.72 (~)	-5.64 (~)			
unobserved	1996	-0.56 (~)	0.40 (~)	1.34 (~)	2.22 (~)			
characteristics	1997	-0.57 (~)	0.26 (~)	0.54 (~)	2.92 (~)			
	1998	-0.45 (~)	0.21 (~)	1.23 (~)	2.14 (~)			
	1999	-0.86 (~)	0.38 (~)	1.84 (~)	3.88 (~)			
	2000	-0.55 (~)	0.26 (~)	1.17 (~)	2.35 (~)			
	2001	-0.72 (~)	0.81 (~)	2.05 (~)	2.62 (~)			
unobserved	1995	-0.68 (~)	-0.04 (~)	11.32 (~)	8.33 (~)			
characteristics	1996	2.78 (~)	2.00 (~)	4.80 (~)	-2.67 (~)			
	1997	0.53 (~)	4.73 (~)	5.39 (~)	5.11 (~)			
	1998	1.99 (~)	4.99 (~)	7.13 (~)	-4.74 (~)			
	1999	1.30 (~)	3.46 (~)	6.74 (~)	2.18 (~)			
	2000	-1.19 (~)	7.68 (~)	10.81 (~)	3.75 (~)			
	2001	-0.63 (~)	9.47 (~)	13.01 (~)	0.57 (~)			

Notes: Standard errors in parenthesis are computed by linearization of the relevant statistic about the estimated wage function parameter values. # Indicates significance at the 1 per cent level. * Indicates significance at the 5 per cent level. ~ Indicates standard error not computed.

have been largely due to movements in predicted rather than adjusted residual wage differentials for all racial groups other than Indians. In particular, both the African predicted wage deficit and the White predicted wage premium exhibit significant falls between 1993 and 1995, while the Coloured wage deficit is completely eliminated between 1995 and 2001. These changes in predicted wage differentials have been driven by two mutually reinforcing factors. First, the absolute and relative improvement in the occupational and educational attainment of Africans and Coloureds, which almost entirely account for the significant reductions in predicted wage differentials due to the effects of changes in the distribution of observed characteristics holding returns constant. Second, changes in the level of hypothetical, non-discriminatory returns over time have generally had the effect of further reducing predicted wage differentials. Overall, predicted wage differentials due to racial disparities in occupational attainment fell by roughly one third in the cases of Africans, Indians and Whites, and by three quarters in the cases of Coloureds, between 1993 and 2001. Falls in the predicted wage differentials due to racial disparities in educational attainment have been less dramatic though the decomposition results do provide evidence of partial convergence in qualifications.

Virtually none of the gross changes in the residual wage differentials are significantly different from zero. Nevertheless, the results presented in Table 4 from the two decompositions of the changes in the unadjusted residual wage differentials are of some interest. The standard approach (A) accounts for changes in the unadjusted residual wage differential in terms of changes in the returns to and levels of observed characteristics, where racial differences in returns may reflect the effects either of discrimination or of unobserved disparities in the quality of observed characteristics. The decomposition reveals a slight but statistically significant fall in the degree of 'underpayment' faced by Africans in the post-apartheid era (together with an offsetting effect due to changes in the relative characteristics of the African workforce). But the observed (discriminatory) returns for all races rise relative to the hypothesised returns in a non-

discriminatory labour market due to the increasing proportion of Africans in the workforce, so the degree of African ‘underpayment’ has not in fact fallen relative to any other racial group. These results therefore do not provide evidence in support of a reduction in the extent of either wage discrimination or racial disparities in the quality of observed characteristics.

The alternative decomposition (B) permits an interpretation in terms of changes in the returns to and levels of unobserved characteristics if residual wage differences are entirely due to disparities in unobserved characteristics and the overall distribution of such characteristics is constant over time. The results of the decomposition are consistent with the hypothesis that the persistence of residual wage differences in the post-apartheid era is due in part to a general increase in the dispersion of wages. In particular, the deterioration in the relative wage position of Africans, who were concentrated at the bottom of the residual wage distribution, may in some part be due to an increase in returns to unobserved characteristics between 1995 and 2001. Nonetheless, the absolute sizes of the effects attributed to changes in the returns to unobserved characteristics are so small as to suggest that broader changes in the overall distribution of wages were not an important cause of the persistence of residual wage differences.

Overall, the changes in racial wage differences have the somewhat unexpected consequence that the extent to which the racial wage hierarchy can be explained on the basis of racial disparities in observed characteristics has fallen, not risen, following the end of the apartheid regime. The final part of Table 2 reports the amount by which a racial group was underpaid/overpaid relative to the wage it would have received in the hypothesised non-discriminatory labour market. Thus in 2001 the wages of a typical African, Coloured, Indian and White worker were respectively 13 per cent lower, 9 per cent higher, 22 per cent higher and 37 per cent higher than they would have been in the absence of both unobserved racial disparities in characteristics and wage discrimination.

5. Discussion

A central theme of this paper is the way that the racial wage hierarchy evolved in South Africa over the period 1993 to 2001 amongst full-time regular employees of normal working age, but excluding those in the primary sector and the defence forces. We find that the transition to democratic rule in 1994 was accompanied by an improvement in the wage position of the majority African workforce relative to all other racial groups, but that these gains had been largely eroded by 2001. The persistence of racial wage differences following the repeal of all overt discriminatory laws and regulations points to the need for concerted policy interventions to reverse the legacy of apartheid. However, it is important to identify the various sources of this labour market inequality in order to devise appropriate remedial programmes and to monitor their impact on labour market outcomes.

Our multilateral decomposition analysis indicates that the racial wage hierarchy at the end of the apartheid era can largely be explained by observed differences between racial groups, especially in educational and occupational attainment. Since then, the entire education system has been systematically reformed through the passage of the *South African Schools Act 1996*, the *Further Education and Training Act 1998* and the *Higher Education Act 1997*. Schooling has been made compulsory for all children aged seven to fourteen and funding increased significantly with government expenditure on education rising from R31.8 billion in 1994 to R51.1 billion in 2000 [*Department of Education, 2001*]. Our (unreported) wage regressions exhibit positive returns to post-primary education for all races [see also *Moll, 1996; Allanson et al., 2000; Mwabu and Schultz, 2000*], providing non-Whites with the incentives to take advantage of the new opportunities. However, existing reform of the educational system has left in place the option for public schools' governing bodies to 'levy school fees that are binding on the school community', thereby offering the opportunity to maintain privileged and exclusive access to schooling [*Sayed, 1999; 2002*]. More generally, household finances may constrain

participation in education, frustrating attempts to further reduce predicted wage differentials in the absence of significant income and wealth redistribution.

New employment legislation has also been introduced within the general framework established by the *Labour Relations Act 1995*. In particular, the *Employment Equity Act 1998* requires employers to implement affirmative action measures, including preferential treatment and racial employment targets, to ensure the equitable representation of suitably qualified non-Whites in all occupational categories and levels in the workforce. However the experience of the USA in a similar situation suggests that some forms of discrimination can be extremely persistent and difficult to counter by legislation. In particular, the racial segregation of housing in South Africa may maintain labour market segregation through recruitment via local networks and help to sustain employers' beliefs in racial differences [Arrow, 1998]. Standing et al. [1996] provides evidence of informal screening devices adopted in the South African labour market.

The remainder of the racial wage differentials observed in 1993 is due to the combined effects of wage discrimination and unobserved differences between racial groups. Discrimination in remuneration was made illegal by, *inter alia*, the *Labour Relations Act 1995* which gave effect to the Constitutional right to fair labour practices. Employees were further given the right by the *Employment Equity Bill 1998* to institute proceedings through the Commission for Conciliation Mediation and Arbitration for alleged discrimination, with the burden of proof falling on the employer [Barker, 1999]. These various labour market measures provide powerful instruments to counter the discriminatory practices that have sustained the overpayment of Whites and the underpayment of other races.

Residual wage differentials may also be reduced by the fundamental reform of the education system to the extent that this serves to decrease the unobserved differences between racial groups. In particular, the more equitable distribution of educational funding has had the effect of reducing historical inequities in learning conditions though considerable variation still

exists within the public schooling system [*Department of Education, 2001*]. In addition, reform of the curriculum, which is envisaged in the '*Curriculum 2005*' initiative [*Department of Education, 2001*], has considerable potential to improve the productivity of non-Whites [*Moll, 1998*]. However these changes will have only a gradual impact on the racial wage hierarchy as newly-qualified entrants are absorbed into the labour market.

Our multilateral decomposition analysis also provides some of the first, detailed evidence about the subsequent evolution of the wage hierarchy in the post-apartheid era. We find that the predicted wage differentials have fallen somewhat, due in part to the greater representation of African and Coloured workers in White-collar jobs in the public sector and a narrowing of the gaps in educational attainment. But the relative improvement in the measured characteristics of the African workforce at the time of the transition to democratic rule has not been sustained in the post-apartheid era. The residual wage differentials have not declined, remaining virtually constant throughout the entire period in the case of Africans and Whites. We show that the increasing inequality in the overall distribution of wages could have had only a negligible effect on racial wage differentials.

These findings suggest that the policy reforms of the post-apartheid era have yet to have had a significant effect on the racial wage hierarchy in the secondary and tertiary sectors. However, it is too early to judge the effectiveness of these reforms given their timing and the endemic nature of the problems that they are designed to tackle. Only time will tell whether they are sufficient to eliminate the disadvantages and discrimination faced by non-Whites in the labour market as a legacy of apartheid or whether further policy interventions will be needed to achieve this goal.

Notes

¹ If an element of $\Delta\tilde{\beta}_{rs}$ is defined in period t but not in t' then we assume that $\Delta\tilde{\beta}_{rt'} = \Delta\tilde{\beta}_{rt}$, i.e. the difference between the discriminatory and non-discriminatory returns to the characteristic is the same in the two periods. By construction, if an element of $\Delta\tilde{\beta}_{rs}$ is not defined then the value of the corresponding element of \bar{X}_{rs} will be zero.

² Data from the 1993 and 1994 OHSs were not used due to various differences in target population, sample design and methodology, and questionnaire content and wording which render them incompatible with the later surveys for the purpose of this study.

³ Given that $\tilde{\theta}_r \approx \sum_i (\bar{X}_{ir} - \bar{X}_i) \beta_i^* [1 + 1/2 \sum_j (\bar{X}_{jr} - \bar{X}_j) \beta_j^* + 1/6 \sum_j \sum_k (\bar{X}_{jr} - \bar{X}_j) \beta_j^* (\bar{X}_{kr} - \bar{X}_k) \beta_k^* + \dots]$, the contribution of a single characteristic i to $\tilde{\theta}_r$ may be approximated as $[(\bar{X}_{ir} - \bar{X}_i) \beta_i^* / \sum_j (\bar{X}_{jr} - \bar{X}_j) \beta_j^*] \tilde{\theta}_r$

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Appendix: Supplementary Tables.

Mean Characteristics Of Raised Samples

Table 1.93 - 1993

Table 1.95 - 1995

Table 1.96 - 1996

Table 1.97 - 1997

Table 1.98 - 1998

Table 1.99 - 1999

Table 1.00 - 2000

Table 1.01 - 2001

Hourly Wage Functions By Racial Group

Table 2.93 - 1993

Table 2.95 - 1995

Table 2.96 - 1996

Table 2.97 - 1997

Table 2.98 - 1998

Table 2.99 - 1999

Table 2.00 - 2000

Table 2.01 - 2001

TABLE 1.93
MEAN CHARACTERISTICS OF RAISED SAMPLE BY RACIAL GROUP 1993

Variable	Attribute	Racial group				
		All races	Black	Coloured	Asian	White
AGE	Age (in years)	36.570	37.132	34.393	34.516	36.678
AGESQ	AGE ²	1445.6	1489.5	1275.5	1298.7	1451.2
EDPRIM	Primary education (in years)	6.089	5.744	6.430	6.352	6.684
EDSECO	Secondary education (in years)	2.504	1.757	2.079	3.469	4.209
EDTECH	Diploma-level education (in years)	0.181	0.080	0.073	0.115	0.480
EDUNIV	University education (in years)	0.222	0.049	0.000	0.519	0.653
OCCPRO	Professionals & Technicians	0.137	0.070	0.044	0.197	0.322
OCCMAN	Managers	0.074	0.015	0.035	0.100	0.222
OCCCAT	Crafts & Trade	0.157	0.118	0.272	0.220	0.182
OCCSSK	Semi-skilled	0.244	0.304	0.280	0.253	0.088
OCCUSK	Unskilled	0.171	0.248	0.223	0.006	0.005
OCCCSS	Clerks, Service & sales	0.217	0.245	0.146	0.224	0.181
INDEGW	Electricity, Gas & Water	0.047	0.043	0.042	0.012	0.065
INDCON	Construction	0.122	0.131	0.111	0.071	0.118
INDWRT	Wholesale & Retail Trade	0.128	0.146	0.114	0.171	0.084
INDHOT	Hotels & Entertainment	0.024	0.028	0.013	0.012	0.024
INDTSC	Transport, Storage & Communication	0.139	0.127	0.136	0.097	0.177
INDFIN	Financial	0.047	0.017	0.014	0.021	0.138
INDSER	Services	0.209	0.212	0.225	0.259	0.184
INDHHD	Private Households	0.001	0.002	0.000	0.000	0.000
INDMNF	Manufacturing	0.282	0.294	0.345	0.357	0.209
REGWC	Western Cape	0.164	0.056	0.675	0.113	0.203
REGEC	Eastern Cape	0.054	0.063	0.071	0.000	0.038
REGNC	Northern Cape	0.013	0.013	0.050	0.000	0.000
REGFS	Free State	0.064	0.082	0.027	0.000	0.055
REGKN	Kwazulu/Natal	0.183	0.173	0.043	0.759	0.132
REGNW	North-West	0.062	0.099	0.000	0.000	0.017
REGET	Eastern Transvaal	0.068	0.092	0.000	0.013	0.054
REGNP	Northern Province	0.045	0.057	0.000	0.000	0.047
REGGA	Gauteng	0.347	0.364	0.134	0.116	0.453
TUMEM	Trade union membership (Member=1)	0.339	0.387	0.434	0.388	0.174
	Logarithm of hourly wage	2.152	1.724	1.991	2.432	3.155
	Sample size	2228	1349	250	146	483
	Raised sample size	2399912	1400547	260693	138968	599704
	Percentage raised sample		58.4	10.9	5.8	25.0

Source: authors' calculations based on 1993 PSLSD data.

TABLE 1.95
MEAN CHARACTERISTICS OF RAISED SAMPLE BY RACIAL GROUP 1995

Variable	Attribute	Racial group				
		All races	Black	Coloured	Asian	White
AGE	Age (in years)	36.921	37.458	34.744	35.016	37.052
AGESQ	AGE ²	1466.4	1498.2	1313.0	1339.1	1490.8
EDPRIM	Primary education (in years)	6.404	6.131	6.483	6.957	6.999
EDSECO	Secondary education (in years)	3.014	2.521	2.418	3.888	4.525
EDTECH	Diploma-level education (in years)	0.212	0.186	0.117	0.140	0.355
EDUNIV	University education (in years)	0.230	0.131	0.085	0.301	0.573
OCCPRO	Professionals & Technicians	0.158	0.118	0.092	0.168	0.304
OCCMAN	Managers	0.053	0.019	0.019	0.069	0.163
OCCCAT	Crafts & Trade	0.177	0.142	0.264	0.220	0.219
OCCSSK	Semi-skilled	0.191	0.236	0.185	0.163	0.075
OCCUSK	Unskilled	0.169	0.226	0.217	0.035	0.014
OCCCSS	Clerks, Service & sales	0.251	0.257	0.224	0.344	0.226
INDEGW	Electricity, Gas & Water	0.020	0.019	0.013	0.003	0.031
INDCON	Construction	0.083	0.083	0.148	0.047	0.056
INDWRT	Wholesale & Retail Trade	0.176	0.161	0.195	0.316	0.175
INDHOT	Hotels & Entertainment	0.008	0.010	0.004	0.002	0.008
INDTSC	Transport, Storage & Communication	0.098	0.094	0.084	0.081	0.120
INDFIN	Financial	0.036	0.026	0.022	0.021	0.075
INDSER	Services	0.303	0.325	0.242	0.189	0.300
INDHHD	Private Households	0.018	0.028	0.011	0.000	0.000
INDMNF	Manufacturing	0.258	0.255	0.281	0.341	0.235
REGWC	Western Cape	0.151	0.050	0.658	0.027	0.183
REGEC	Eastern Cape	0.084	0.090	0.099	0.022	0.070
REGNC	Northern Cape	0.016	0.005	0.070	0.001	0.020
REGFS	Free State	0.058	0.068	0.017	0.000	0.068
REGKN	Kwazulu/Natal	0.191	0.203	0.031	0.776	0.110
REGNW	North-West	0.062	0.083	0.012	0.009	0.040
REGET	Eastern Transvaal	0.056	0.072	0.006	0.009	0.049
REGNP	Northern Province	0.046	0.067	0.002	0.001	0.021
REGGA	Gauteng	0.336	0.360	0.104	0.154	0.439
TUMEM	Trade union membership (Member=1)	0.416	0.476	0.405	0.325	0.274
	Logarithm of hourly wage	2.304	2.039	2.072	2.556	3.115
	Sample size	9728	5150	1648	679	2251
	Raised sample size	3251609	1990162	389962	163985	707500
	Percentage raised sample		61.2	12.0	5.0	21.8

Source: authors' calculations based on 1995 OHS data.

TABLE 1.96
MEAN CHARACTERISTICS OF RAISED SAMPLE BY RACIAL GROUP 1996

Variable	Attribute	Racial group				
		All races	Black	Coloured	Asian	White
AGE	Age (in years)	36.863	37.066	34.973	36.046	37.732
AGESQ	AGE ²	1464.5	1469.9	1336.0	1417.9	1547.4
EDPRIM	Primary education (in years)	6.376	6.095	6.576	6.920	6.988
EDSECO	Secondary education (in years)	2.893	2.377	2.640	3.798	4.468
EDTECH	Diploma-level education (in years)	0.157	0.116	0.137	0.191	0.290
EDUNIV	University education (in years)	0.255	0.122	0.048	0.367	0.787
OCCPRO	Professionals & Technicians	0.182	0.134	0.124	0.265	0.353
OCCMAN	Managers	0.063	0.026	0.028	0.091	0.194
OCCCAT	Crafts & Trade	0.193	0.181	0.292	0.192	0.160
OCCSSK	Semi-skilled	0.152	0.193	0.104	0.102	0.066
OCCUSK	Unskilled	0.173	0.221	0.197	0.067	0.031
OCCCSS	Clerks, Service & sales	0.238	0.245	0.255	0.284	0.196
INDEGW	Electricity, Gas & Water	0.030	0.025	0.029	0.019	0.048
INDCON	Construction	0.082	0.093	0.108	0.043	0.041
INDWRT	Wholesale & Retail Trade	0.146	0.150	0.142	0.162	0.133
INDHOT	Hotels & Entertainment	0.028	0.033	0.022	0.025	0.018
INDTSC	Transport, Storage & Communication	0.108	0.110	0.090	0.055	0.129
INDFIN	Financial	0.047	0.030	0.026	0.040	0.117
INDSER	Services	0.277	0.289	0.248	0.237	0.272
INDHHD	Private Households	0.019	0.025	0.021	0.003	0.002
INDMNF	Manufacturing	0.261	0.245	0.315	0.416	0.241
REGWC	Western Cape	0.164	0.054	0.648	0.048	0.201
REGEC	Eastern Cape	0.095	0.097	0.148	0.014	0.069
REGNC	Northern Cape	0.018	0.008	0.071	0.000	0.016
REGFS	Free State	0.059	0.068	0.019	0.000	0.074
REGKN	Kwazulu/Natal	0.183	0.193	0.026	0.776	0.123
REGNW	North-West	0.072	0.105	0.008	0.000	0.034
REGET	Eastern Transvaal	0.070	0.094	0.000	0.000	0.057
REGNP	Northern Province	0.052	0.075	0.000	0.000	0.026
REGGA	Gauteng	0.287	0.305	0.080	0.162	0.401
TUMEM	Trade union membership (Member=1)	0.399	0.420	0.450	0.346	0.312
	Logarithm of hourly wage	2.262	1.980	2.183	2.569	3.126
	Sample size	4461	2838	620	332	671
	Raised sample size	2810264	1738031	385281	130716	556236
	Percentage raised sample		61.8	13.7	4.7	19.8

Source: authors' calculations based on 1996 OHS data.

TABLE 1.97
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	37.576	35.118	36.374	37.783
AGESQ	AGE ²	1491.9	1508.4	1343.4	1444.8	1547.6
EDPRIM	Primary education (in years)	6.296	5.993	6.487	6.933	6.958
EDSECO	Secondary education (in years)	2.824	2.277	2.456	3.898	4.494
EDTECH	Diploma-level education (in years)	0.201	0.138	0.107	0.149	0.467
EDUNIV	University education (in years)	0.198	0.090	0.081	0.291	0.585
OCCPRO	Professionals & Technicians	0.157	0.109	0.121	0.208	0.316
OCCMAN	Managers	0.086	0.042	0.065	0.161	0.220
OCCCAT	Crafts & Trade	0.196	0.195	0.248	0.139	0.178
OCCSSK	Semi-skilled	0.163	0.204	0.130	0.125	0.069
OCCUSK	Unskilled	0.206	0.249	0.261	0.114	0.062
OCCCSS	Clerks, Service & sales	0.192	0.202	0.175	0.253	0.155
INDEGW	Electricity, Gas & Water	0.027	0.026	0.020	0.009	0.037
INDCON	Construction	0.089	0.094	0.134	0.038	0.055
INDWRT	Wholesale & Retail Trade	0.161	0.155	0.158	0.231	0.163
INDHOT	Hotels & Entertainment	0.023	0.022	0.011	0.026	0.033
INDTSC	Transport, Storage & Communication	0.100	0.099	0.091	0.072	0.116
INDFIN	Financial	0.035	0.025	0.032	0.043	0.066
INDSER	Services	0.247	0.247	0.241	0.181	0.268
INDHHD	Private Households	0.050	0.068	0.040	0.011	0.010
INDMNF	Manufacturing	0.268	0.264	0.272	0.389	0.251
REGWC	Western Cape	0.159	0.052	0.683	0.031	0.183
REGEC	Eastern Cape	0.074	0.081	0.093	0.018	0.053
REGNC	Northern Cape	0.019	0.009	0.071	0.002	0.018
REGFS	Free State	0.060	0.071	0.020	0.001	0.069
REGKN	Kwazulu/Natal	0.171	0.172	0.033	0.746	0.116
REGNW	North-West	0.065	0.094	0.004	0.021	0.028
REGET	Eastern Transvaal	0.068	0.084	0.005	0.010	0.071
REGNP	Northern Province	0.058	0.088	0.001	0.000	0.016
REGGA	Gauteng	0.326	0.348	0.090	0.172	0.446
TUMEM	Trade union membership (Member=1)	0.419	0.466	0.444	0.392	0.263
	Logarithm of hourly wage	2.250	1.938	2.223	2.612	3.146
	Sample size	7992	5002	1454	397	1139
	Raised sample size	2981973	1854083	384426	144300	599164
	Percentage raised sample		62.2	12.9	4.8	20.1

Source: authors' calculations based on 1997 OHS data.

TABLE 1.98
MEAN CHARACTERISTICS OF RAISED SAMPLE BY RACIAL GROUP 1998

Variable	Attribute	Racial group				
		All races	Black	Coloured	Asian	White
AGE	Age (in years)	36.845	37.323	34.332	36.849	36.979
AGESQ	AGE ²	1465.8	1493.1	1288.7	1491.8	1487.8
EDPRIM	Primary education (in years)	6.280	5.948	6.493	6.865	6.983
EDSECO	Secondary education (in years)	2.908	2.323	2.645	3.885	4.553
EDTECH	Diploma-level education (in years)	0.220	0.150	0.161	0.227	0.460
EDUNIV	University education (in years)	0.204	0.075	0.097	0.310	0.628
OCCPRO	Professionals & Technicians	0.158	0.100	0.118	0.193	0.340
OCCMAN	Managers	0.090	0.037	0.067	0.192	0.236
OCCCAT	Crafts & Trade	0.205	0.210	0.269	0.130	0.168
OCCSSK	Semi-skilled	0.157	0.199	0.139	0.144	0.049
OCCUSK	Unskilled	0.162	0.210	0.196	0.036	0.032
OCCCSS	Clerks, Service & sales	0.228	0.244	0.212	0.305	0.176
INDEGW	Electricity, Gas & Water	0.022	0.023	0.013	0.004	0.031
INDCON	Construction	0.099	0.109	0.145	0.041	0.057
INDWRT	Wholesale & Retail Trade	0.161	0.153	0.174	0.197	0.168
INDHOT	Hotels & Entertainment	0.038	0.039	0.017	0.068	0.043
INDTSC	Transport, Storage & Communication	0.105	0.109	0.087	0.090	0.109
INDFIN	Financial	0.036	0.022	0.033	0.053	0.076
INDSER	Services	0.280	0.282	0.246	0.161	0.321
INDHHD	Private Households	0.021	0.032	0.012	0.000	0.000
INDMNF	Manufacturing	0.236	0.231	0.273	0.386	0.195
REGWC	Western Cape	0.168	0.062	0.676	0.044	0.188
REGEC	Eastern Cape	0.084	0.089	0.102	0.000	0.077
REGNC	Northern Cape	0.021	0.011	0.073	0.003	0.023
REGFS	Free State	0.071	0.086	0.024	0.000	0.071
REGKN	Kwazulu/Natal	0.168	0.174	0.019	0.772	0.113
REGNW	North-West	0.068	0.098	0.010	0.006	0.033
REGET	Eastern Transvaal	0.063	0.084	0.007	0.021	0.045
REGNP	Northern Province	0.064	0.098	0.001	0.015	0.016
REGGA	Gauteng	0.292	0.299	0.088	0.138	0.434
TUMEM	Trade union membership (Member=1)	0.393	0.452	0.444	0.303	0.212
	Logarithm of hourly wage	2.268	1.941	2.339	2.629	3.096
	Sample size	4381	2755	711	216	699
	Raised sample size	2531825	1552328	331722	116805	530969
	Percentage raised sample		61.3	13.1	4.6	21.0

Source: authors' calculations based on 1998 OHS data.

TABLE 1.99
MEAN CHARACTERISTICS OF RAISED SAMPLE BY RACIAL GROUP 1999

Variable	Attribute	Racial group				
		All races	Black	Coloured	Asian	White
AGE	Age (in years)	36.627	37.143	34.857	36.559	36.136
AGESQ	AGE ²	1439.4	1472.1	1315.5	1438.9	1414.6
EDPRIM	Primary education (in years)	6.438	6.185	6.611	6.929	6.999
EDSECO	Secondary education (in years)	3.078	2.560	2.760	3.957	4.668
EDTECH	Diploma-level education (in years)	0.171	0.140	0.109	0.204	0.299
EDUNIV	University education (in years)	0.342	0.197	0.128	0.264	0.939
OCCPRO	Professionals & Technicians	0.183	0.134	0.130	0.211	0.360
OCCMAN	Managers	0.083	0.036	0.071	0.110	0.228
OCCCAT	Crafts & Trade	0.174	0.176	0.245	0.126	0.133
OCCSSK	Semi-skilled	0.175	0.210	0.177	0.215	0.056
OCCUSK	Unskilled	0.137	0.174	0.166	0.057	0.023
OCCCSS	Clerks, Service & sales	0.249	0.270	0.210	0.280	0.200
INDEGW	Electricity, Gas & Water	0.019	0.022	0.008	0.024	0.015
INDCON	Construction	0.073	0.081	0.121	0.031	0.030
INDWRT	Wholesale & Retail Trade	0.160	0.153	0.191	0.202	0.153
INDHOT	Hotels & Entertainment	0.035	0.035	0.029	0.032	0.039
INDTSC	Transport, Storage & Communication	0.102	0.102	0.071	0.110	0.121
INDFIN	Financial	0.043	0.024	0.026	0.042	0.112
INDSER	Services	0.310	0.324	0.265	0.226	0.311
INDHHD	Private Households	0.013	0.017	0.016	0.002	0.000
INDMNF	Manufacturing	0.245	0.242	0.273	0.331	0.218
REGWC	Western Cape	0.169	0.065	0.694	0.015	0.201
REGEC	Eastern Cape	0.071	0.069	0.072	0.008	0.090
REGNC	Northern Cape	0.015	0.007	0.059	0.001	0.015
REGFS	Free State	0.059	0.068	0.025	0.002	0.065
REGKN	Kwazulu/Natal	0.173	0.180	0.059	0.808	0.078
REGNW	North-West	0.065	0.091	0.008	0.013	0.030
REGET	Eastern Transvaal	0.061	0.079	0.004	0.014	0.051
REGNP	Northern Province	0.062	0.088	0.001	0.004	0.031
REGGA	Gauteng	0.326	0.353	0.078	0.135	0.439
TUMEM	Trade union membership (Member=1)	0.465	0.504	0.445	0.356	0.380
	Logarithm of hourly wage	2.391	2.081	2.395	2.653	3.286
	Sample size	5203	3397	769	206	831
	Raised sample size	2298688	1440430	285662	104562	468034
	Percentage raised sample		62.7	12.4	4.5	20.4

Source: authors' calculations based on 1999 OHS data.

TABLE 1.00
MEAN CHARACTERISTICS OF RAISED SAMPLE BY RACIAL GROUP 2000

Variable	Attribute	Racial group				
		All races	Black	Coloured	Asian	White
AGE	Age (in years)	36.989	37.100	34.888	36.326	38.122
AGESQ	AGE ²	1473.6	1476.7	1318.8	1426.1	1570.8
EDPRIM	Primary education (in years)	6.458	6.177	6.663	6.931	7.000
EDSECO	Secondary education (in years)	3.139	2.527	3.070	4.091	4.650
EDTECH	Diploma-level education (in years)	0.214	0.139	0.171	0.280	0.434
EDUNIV	University education (in years)	0.349	0.146	0.214	0.350	1.008
OCCPRO	Professionals & Technicians	0.170	0.118	0.130	0.173	0.342
OCCMAN	Managers	0.065	0.018	0.042	0.110	0.200
OCCCAT	Crafts & Trade	0.211	0.226	0.251	0.147	0.164
OCCSSK	Semi-skilled	0.161	0.202	0.158	0.167	0.046
OCCUSK	Unskilled	0.151	0.196	0.190	0.056	0.026
OCCCSS	Clerks, Service & sales	0.241	0.240	0.229	0.346	0.222
INDEGW	Electricity, Gas & Water	0.019	0.020	0.011	0.007	0.023
INDCON	Construction	0.099	0.121	0.118	0.051	0.037
INDWRT	Wholesale & Retail Trade	0.172	0.159	0.179	0.271	0.176
INDHOT	Hotels & Entertainment	0.033	0.036	0.026	0.034	0.029
INDTSC	Transport, Storage & Communication	0.101	0.105	0.089	0.093	0.099
INDFIN	Financial	0.047	0.025	0.022	0.046	0.125
INDSER	Services	0.273	0.267	0.271	0.173	0.318
INDHHD	Private Households	0.008	0.012	0.007	0.000	0.001
INDMNF	Manufacturing	0.249	0.254	0.278	0.324	0.192
REGWC	Western Cape	0.157	0.048	0.691	0.008	0.193
REGEC	Eastern Cape	0.083	0.084	0.098	0.019	0.090
REGNC	Northern Cape	0.016	0.008	0.050	0.000	0.019
REGFS	Free State	0.044	0.052	0.014	0.003	0.051
REGKN	Kwazulu/Natal	0.205	0.213	0.040	0.750	0.123
REGNW	North-West	0.063	0.092	0.011	0.002	0.030
REGET	Eastern Transvaal	0.054	0.072	0.007	0.018	0.043
REGNP	Northern Province	0.057	0.082	0.003	0.056	0.017
REGGA	Gauteng	0.322	0.350	0.086	0.145	0.435
TUMEM	Trade union membership (Member=1)	0.369	0.390	0.419	0.352	0.285
	Logarithm of hourly wage	2.421	2.017	2.521	2.736	3.419
	Sample size	5812	3905	834	293	780
	Raised sample size	2714918	1633387	342253	165818	573460
	Percentage raised sample		60.2	12.6	6.1	21.1

Source: authors' calculations based on September 2000 LFS data.

TABLE 1.01
MEAN CHARACTERISTICS OF RAISED SAMPLE BY RACIAL GROUP 2001

Variable	Attribute	Racial group				
		All races	Black	Coloured	Asian	White
AGE	Age (in years)	37.202	36.981	35.806	36.736	38.834
AGESQ	AGE ²	1485.2	1460.0	1386.6	1465.7	1624.6
EDPRIM	Primary education (in years)	6.486	6.241	6.622	6.904	6.999
EDSECO	Secondary education (in years)	3.236	2.722	2.984	4.135	4.618
EDTECH	Diploma-level education (in years)	0.202	0.170	0.142	0.193	0.334
EDUNIV	University education (in years)	0.336	0.196	0.155	0.420	0.833
OCCPRO	Professionals & Technicians	0.180	0.127	0.140	0.248	0.339
OCCMAN	Managers	0.072	0.022	0.060	0.123	0.208
OCCCAT	Crafts & Trade	0.199	0.204	0.254	0.151	0.167
OCCSSK	Semi-skilled	0.168	0.211	0.154	0.113	0.066
OCCUSK	Unskilled	0.137	0.182	0.151	0.067	0.021
OCCCSS	Clerks, Service & sales	0.244	0.254	0.242	0.298	0.200
INDEGW	Electricity, Gas & Water	0.025	0.023	0.020	0.019	0.033
INDCON	Construction	0.091	0.111	0.117	0.016	0.042
INDWRT	Wholesale & Retail Trade	0.171	0.165	0.158	0.249	0.169
INDHOT	Hotels & Entertainment	0.029	0.034	0.020	0.033	0.018
INDTSC	Transport, Storage & Communication	0.102	0.101	0.103	0.091	0.106
INDFIN	Financial	0.034	0.021	0.033	0.040	0.071
INDSER	Services	0.282	0.288	0.259	0.227	0.299
INDHHD	Private Households	0.006	0.009	0.001	0.004	0.001
INDMNF	Manufacturing	0.261	0.248	0.289	0.320	0.262
REGWC	Western Cape	0.145	0.046	0.675	0.005	0.173
REGEC	Eastern Cape	0.074	0.074	0.094	0.027	0.080
REGNC	Northern Cape	0.013	0.006	0.052	0.000	0.017
REGFS	Free State	0.059	0.067	0.020	0.011	0.075
REGKN	Kwazulu/Natal	0.236	0.241	0.051	0.780	0.149
REGNW	North-West	0.058	0.083	0.007	0.012	0.028
REGET	Eastern Transvaal	0.065	0.084	0.006	0.018	0.058
REGNP	Northern Province	0.058	0.091	0.000	0.003	0.012
REGGA	Gauteng	0.292	0.308	0.094	0.144	0.409
TUMEM	Trade union membership (Member=1)	0.398	0.419	0.428	0.323	0.342
	Logarithm of hourly wage	2.451	2.075	2.571	2.833	3.375
	Sample size	6185	4106	849	331	899
	Raised sample size	2800556	1703257	335760	189396	572143
	Percentage raised sample		60.8	12.0	6.8	20.4

Source: authors' calculations based on September 2001 LFS data.

TABLE 2.93
HOURLY WAGE FUNCTIONS BY RACIAL GROUP 1993

Variable	Racial group									
	All		Black		Coloured		Asian		White	
	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
AGE	0.0755 [#]	0.0111	0.0639 [#]	0.0133	0.0577 [#]	0.0155	0.1364 [#]	0.0350	0.1542 [#]	0.0207
AGESQ	-0.0008 [#]	0.0001	-0.0007 [#]	0.0002	-0.0006 [#]	0.0002	-0.0016 [#]	0.0005	-0.0017 [#]	0.0003
EDPRIM	0.0028	0.0091	0.0182	0.0097	0.0184	0.0405	-0.0961 [#]	0.0325	0.0050	0.0363
EDSECO	0.1320 [#]	0.0125	0.0853 [#]	0.0131	0.0929 [#]	0.0260	0.0895 [*]	0.0445	0.0404	0.0295
EDTECH	0.1669 [#]	0.0283	0.1365 [*]	0.0668	0.2220	0.1269	0.2074 [*]	0.0845	0.0809 [#]	0.0281
EDUNIV	0.1373 [#]	0.0194	0.2204 [#]	0.0407	~	0.0000	0.1428 [#]	0.0537	0.0799 [#]	0.0232
OCCPRO	0.6155 [#]	0.0700	0.5009 [#]	0.1282	0.1795	0.1718	0.3837	0.2700	0.3850 [#]	0.1073
OCCMAN	0.8509 [#]	0.0832	0.6308 [#]	0.1344	0.6540 [#]	0.1808	0.3259	0.2159	0.4282 [#]	0.1132
OCCCAT	0.0695	0.0645	-0.0248	0.0756	0.0620	0.1543	0.0109	0.1291	-0.0288	0.0980
OCCSSK	-0.1715 [#]	0.0544	-0.0910	0.0591	-0.1272	0.1951	-0.2286	0.1867	0.0229	0.1256
OCCUSK	-0.4252 [#]	0.0727	-0.2678 [#]	0.0738	-0.4039 [*]	0.1739	0.3501	0.1823	-0.8622	1.0158
INDEGW	0.0127	0.0839	-0.1102	0.0801	-0.0939	0.1964	0.3110	0.1644	0.0846	0.1011
INDCON	-0.0695	0.0591	-0.1106	0.0664	0.0039	0.1462	0.1077	0.2248	-0.0733	0.1273
INDWRT	-0.1065 [*]	0.0470	-0.0811	0.0541	-0.0773	0.1169	-0.0668	0.2102	0.0073	0.1141
INDHOT	-0.3663 [#]	0.1068	-0.4076 [#]	0.1106	-0.1759	0.2309	-0.8853 [#]	0.2933	-0.1465	0.2001
INDTSC	0.0196	0.0487	-0.0808	0.0560	0.0822	0.1345	0.1154	0.1288	-0.1092	0.0674
INDFIN	0.1632 [*]	0.0743	0.1903	0.1280	0.3277	0.2193	-0.5200	0.9707	0.0282	0.0873
INDSER	-0.2584 [#]	0.0514	-0.2363 [#]	0.0730	0.0801	0.0959	-0.0839	0.1753	-0.1947 [*]	0.0971
INDHHD	-1.0921 [*]	0.4640	-1.0513 [*]	0.5097	~	0.0000	~	0.0000	~	0.0000
REGWC	-0.0258	0.0654	-0.0560	0.0800	-0.4637 [#]	0.1194	-0.3204	0.3379	-0.2513 [#]	0.0876
REGEC	-0.1463	0.0931	-0.0907	0.1008	-0.2261	0.1423	~	0.0000	-0.2690 [*]	0.1261
REGNC	-0.2613	0.3580	0.4829 [#]	0.0514	-1.3270 [#]	0.2455	~	0.0000	~	0.0000
REGFS	-0.3785 [#]	0.0891	-0.2942 [#]	0.0833	-0.5329 [#]	0.0961	~	0.0000	-0.2763	0.1707
REGKN	-0.2300 [#]	0.0679	-0.2085 [#]	0.0705	-0.6413 [#]	0.0957	-0.2170	0.2767	-0.2036 [*]	0.0824
REGNW	-0.3116 [#]	0.0795	-0.1652 [*]	0.0816	~	0.0000	~	0.0000	-0.2473 [*]	0.1009
REGET	-0.3276 [#]	0.0996	-0.1989 [*]	0.0953	~	0.0000	0.1634	0.3153	-0.2113 [#]	0.0721
REGNP	-0.4073 [#]	0.1377	-0.3148 [#]	0.1118	~	0.0000	~	0.0000	-0.4830 [#]	0.1324
TUMEM	0.1968 [#]	0.0310	0.3127 [#]	0.0351	0.3038 [#]	0.0854	0.0932	0.0998	0.0310	0.0626
Constant	0.2531	0.2081	0.2290	0.2618	0.7926 [*]	0.3152	0.0925	0.5827	-0.2860	0.4472
Model χ^2	1887136 [#]		640629 [#]		166366 [#]		105205 [#]		342255 [#]	

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

TABLE 2.95
HOURLY WAGE FUNCTIONS BY RACIAL GROUP 1995

Variable	Racial group									
	All		Black		Coloured		Asian		White	
	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
AGE	0.0634 [#]	0.0047	0.0538 [#]	0.0069	0.0846 [#]	0.0085	0.1059 [#]	0.0137	0.1146 [#]	0.0079
AGESQ	-0.0006 [#]	0.0001	-0.0005 [#]	0.0001	-0.0009 [#]	0.0001	-0.0011 [#]	0.0002	-0.0012 [#]	0.0001
EDPRIM	0.0143 [#]	0.0054	0.0105	0.0058	0.0347 [#]	0.0117	-0.0224	0.0498	0.1425	0.2387
EDSECO	0.1464 [#]	0.0058	0.0975 [#]	0.0069	0.0923 [#]	0.0103	0.1313 [#]	0.0236	0.1184 [#]	0.0174
EDTECH	0.0702 [#]	0.0154	0.0914 [#]	0.0222	0.0934 [#]	0.0334	0.2092 [#]	0.0311	0.0443 [#]	0.0163
EDUNIV	0.1102 [#]	0.0088	0.1259 [#]	0.0140	0.1125 [#]	0.0357	0.1123 [#]	0.0193	0.0786 [#]	0.0105
OCCPRO	0.3874 [#]	0.0272	0.2942 [#]	0.0380	0.4067 [#]	0.0718	0.2408 [#]	0.0720	0.2988 [#]	0.0381
OCCMAN	0.6418 [#]	0.0369	0.4462 [#]	0.0769	0.3977 [#]	0.1106	0.2611 [#]	0.0875	0.4274 [#]	0.0472
OCCCAT	0.0889 [#]	0.0248	-0.0230	0.0354	-0.0033	0.0442	-0.0650	0.0735	0.0798 [*]	0.0389
OCCSSK	-0.0969 [#]	0.0240	-0.0331	0.0293	-0.0367	0.0479	-0.1232	0.0776	-0.0683	0.0582
OCCUSK	-0.2825 [#]	0.0280	-0.2298 [#]	0.0324	-0.3386 [#]	0.0492	-0.1665	0.1409	-0.3327 [#]	0.1095
INDEGW	0.1499 [#]	0.0474	0.1954 [#]	0.0668	0.1766	0.1147	-0.1685	0.0953	0.0160	0.0602
INDCON	-0.2013 [#]	0.0326	-0.1393 [#]	0.0437	-0.1379 [*]	0.0578	-0.1808	0.1455	-0.0712	0.0615
INDWRT	-0.2029 [#]	0.0257	-0.2027 [#]	0.0365	-0.1193 [*]	0.0547	-0.2103 [#]	0.0676	-0.1845 [#]	0.0427
INDHOT	-0.0803	0.0768	0.0246	0.0883	0.1991	0.1082	0.3252 [#]	0.0799	-0.2700	0.1506
INDTSC	0.0331	0.0287	0.0075	0.0388	0.0782	0.0632	0.0003	0.0849	0.0036	0.0445
INDFIN	0.0291	0.0394	0.0340	0.0552	-0.0223	0.0963	0.0981	0.1572	0.0360	0.0506
INDSER	-0.0674 [#]	0.0240	0.0330	0.0329	-0.0022	0.0480	-0.1470 [*]	0.0743	-0.1003 [*]	0.0391
INDHHD	-0.9375 [#]	0.0649	-0.8948 [#]	0.0740	-0.5424 [#]	0.1366	~	0.0000	-0.5332	0.7540
REGWC	-0.1416 [#]	0.0302	-0.2067 [#]	0.0635	-0.3367 [#]	0.0649	-0.3985 [#]	0.1318	-0.2108 [#]	0.0420
REGEC	-0.2823 [#]	0.0312	-0.2902 [#]	0.0364	-0.3715 [#]	0.0780	-0.3495 [*]	0.1469	-0.2189 [#]	0.0499
REGNC	-0.3325 [#]	0.0569	-0.4556 [#]	0.1501	-0.6307 [#]	0.0855	-0.2469 [*]	0.0978	-0.2887 [#]	0.0599
REGFS	-0.4623 [#]	0.0426	-0.5510 [#]	0.0412	-0.6437 [#]	0.1669	~	0.0000	-0.2199 [#]	0.0467
REGKN	-0.2461 [#]	0.0287	-0.2382 [#]	0.0346	-0.1868 [*]	0.0829	-0.2680 [#]	0.0731	-0.1700 [#]	0.0487
REGNW	-0.2978 [#]	0.0406	-0.2211 [#]	0.0475	-0.3827 [*]	0.1499	0.0849	0.1097	-0.2396 [#]	0.0666
REGET	-0.2838 [#]	0.0539	-0.3124 [#]	0.0619	-0.0441	0.1211	0.0908	0.1555	-0.1087 [*]	0.0448
REGNP	-0.2008 [#]	0.0475	-0.1196 [*]	0.0491	0.0323	0.1378	0.0336	0.1006	-0.0044	0.0823
TUMEM	0.0739 [#]	0.0154	0.1495 [#]	0.0201	0.1778 [#]	0.0360	0.0959 [*]	0.0459	0.0942 [#]	0.0265
Constant	0.4119 [#]	0.1014	0.6159 [#]	0.1488	0.1650	0.2026	0.1285	0.4127	-0.9380	1.6710
Model χ^2	2525866		1263610		267992		102986		434390	

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

TABLE 2.96
HOURLY WAGE FUNCTIONS BY RACIAL GROUP 1996

Variable	Racial group									
	All		Black		Coloured		Asian		White	
	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
AGE	0.0833 [#]	0.0085	0.0694 [#]	0.0110	0.1191 [#]	0.0156	0.0810 [#]	0.0168	0.1330 [#]	0.0181
AGESQ	-0.0008 [#]	0.0001	-0.0007 [#]	0.0001	-0.0012 [#]	0.0002	-0.0008 [#]	0.0002	-0.0014 [#]	0.0002
EDPRIM	0.0240 [*]	0.0096	0.0229 [*]	0.0105	0.0332	0.0219	-0.0594	0.0596	0.0230	0.0383
EDSECO	0.1510 [#]	0.0101	0.0970 [#]	0.0117	0.1490 [#]	0.0191	0.0681 [#]	0.0254	0.1775 [#]	0.0348
EDTECH	0.1752 [#]	0.0257	0.1772 [#]	0.0360	0.1430 [*]	0.0564	0.2773 [#]	0.0707	0.1006 [*]	0.0431
EDUNIV	0.1593 [#]	0.0138	0.1697 [#]	0.0205	0.2016 [#]	0.0577	0.1285 [#]	0.0348	0.0909 [#]	0.0192
OCCPRO	0.3445 [#]	0.0443	0.3479 [#]	0.0603	0.0349	0.0919	0.2595 [#]	0.0880	0.2623 [#]	0.0790
OCCMAN	0.6356 [#]	0.0646	0.4874 [#]	0.1139	0.4716 [#]	0.1302	0.3162 [#]	0.1203	0.3924 [#]	0.0923
OCCCAT	0.0340	0.0457	0.0599	0.0574	-0.0969	0.0917	-0.2112 [*]	0.0992	0.0406	0.0900
OCCSSK	-0.0310	0.0490	0.0678	0.0559	-0.1534	0.1157	-0.2024	0.1144	0.0798	0.1523
OCCUSK	-0.1416 [#]	0.0448	-0.0342	0.0523	-0.1683	0.0904	-0.3150	0.1708	-0.5275 [#]	0.1721
INDEGW	0.0841	0.0831	0.0761	0.1261	0.0785	0.1476	0.1578	0.2317	-0.1124	0.0917
INDCON	-0.2098 [#]	0.0560	-0.1855 [#]	0.0676	-0.1379	0.1111	-0.2740	0.1477	-0.1102	0.1397
INDWRT	-0.1767 [#]	0.0475	-0.1935 [#]	0.0628	0.0090	0.0921	-0.1822	0.1010	-0.1455	0.0837
INDHOT	-0.4573 [#]	0.0941	-0.3487 [#]	0.1148	-0.3592	0.2089	-0.7469 [#]	0.1870	-0.5474 [#]	0.1750
INDTSC	-0.0510	0.0453	-0.0543	0.0585	0.0889	0.0995	-0.0139	0.1607	-0.2426 [#]	0.0800
INDFIN	0.0043	0.0700	0.1245	0.0839	0.0359	0.1418	-0.1450	0.1225	-0.1694	0.1212
INDSER	-0.1214 [#]	0.0400	-0.0065	0.0509	0.0334	0.0827	-0.0780	0.1194	-0.2678 [#]	0.0727
INDHHD	-0.5752 [#]	0.0883	-0.6095 [#]	0.1010	-0.3252 [#]	0.1160	0.1485	0.4008	0.3867 [#]	0.0992
REGWC	0.0082	0.0487	-0.1653 [#]	0.0617	-0.1510	0.1138	0.1649	0.1826	-0.1095	0.0853
REGEC	-0.2082 [#]	0.0659	-0.1975 [#]	0.0722	-0.3750 [*]	0.1480	0.0505	0.2033	-0.0139	0.0820
REGNC	-0.3467 [#]	0.0957	-0.2231 [*]	0.1076	-0.7597 [#]	0.1509	~	0.0000	-0.2689	0.2418
REGFS	-0.2597 [#]	0.0700	-0.2689 [#]	0.0789	-0.2462	0.1264	~	0.0000	-0.2458 [*]	0.0971
REGKN	-0.2113 [#]	0.0604	-0.2312 [#]	0.0765	-0.5290	0.3089	-0.0257	0.0938	-0.0239	0.1007
REGNW	-0.2083 [#]	0.0628	-0.0580	0.0696	-0.4135 [#]	0.1447	~	0.0000	-0.6703 [#]	0.2497
REGET	-0.3024 [#]	0.0637	-0.2695 [#]	0.0693	~	0.0000	~	0.0000	-0.2375 [*]	0.1140
REGNP	-0.2931 [#]	0.0700	-0.2193 [#]	0.0754	~	0.0000	~	0.0000	-0.2331	0.1307
TUMEM	0.1930 [#]	0.0285	0.2485 [#]	0.0370	0.2457 [#]	0.0632	0.0300	0.0766	0.1339 [#]	0.0498
Constant	-0.2295	0.1846	0.0623	0.2377	-0.8034 [*]	0.3695	0.9339 [*]	0.4241	-0.7497	0.4498
Model χ^2	1728631		675538		284035		70595		364389	

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

TABLE 2.97
HOURLY WAGE FUNCTIONS BY RACIAL GROUP 1997

Variable	Racial group									
	All		Black		Coloured		Asian		White	
	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
AGE	0.0633 [#]	0.0058	0.0752 [#]	0.0073	0.0784 [#]	0.0096	0.0809 [#]	0.0149	0.0763 [#]	0.0148
AGESQ	-0.0006 [#]	0.0001	-0.0008 [#]	0.0001	-0.0009 [#]	0.0001	-0.0009 [#]	0.0002	-0.0008 [#]	0.0002
EDPRIM	0.0384 [#]	0.0053	0.0363 [#]	0.0055	0.0361 [*]	0.0157	0.0148	0.0397	0.0627	0.0620
EDSECO	0.1209 [#]	0.0065	0.0694 [#]	0.0069	0.0500 [#]	0.0125	0.0921 [#]	0.0234	0.1150 [#]	0.0247
EDTECH	0.1708 [#]	0.0183	0.1955 [#]	0.0233	0.2652 [#]	0.0317	0.1723 [#]	0.0562	0.0331	0.0282
EDUNIV	0.1507 [#]	0.0149	0.1870 [#]	0.0159	0.1939 [#]	0.0234	0.0555	0.0388	0.0651 [#]	0.0236
OCCPRO	0.3809 [#]	0.0356	0.3398 [#]	0.0458	0.1720 [#]	0.0613	0.0901	0.0862	0.2968 [#]	0.0739
OCCMAN	0.5619 [#]	0.0420	0.3883 [#]	0.0535	0.1739 [*]	0.0835	0.0093	0.1096	0.4598 [#]	0.0740
OCCCAT	0.0990 [#]	0.0333	0.0975 [#]	0.0361	-0.0550	0.0589	-0.3122 [#]	0.0995	0.0972	0.0749
OCCSSK	-0.0401	0.0314	0.0535	0.0357	-0.0952	0.0669	-0.4946 [#]	0.1115	-0.1079	0.0989
OCCUSK	-0.1473 [#]	0.0316	-0.1019 [#]	0.0375	-0.2581 [#]	0.0592	-0.2824 [*]	0.1206	-0.0462	0.0848
INDEGW	0.1476 [*]	0.0611	0.2223 [#]	0.0700	0.0725	0.0844	-0.1932	0.3728	0.0138	0.1210
INDCON	-0.0978 [#]	0.0361	-0.0382	0.0398	-0.0798	0.0609	0.1334	0.1087	-0.1843	0.1161
INDWRT	-0.1970 [#]	0.0301	-0.1815 [#]	0.0344	-0.1396 [*]	0.0576	-0.0455	0.0759	-0.2230 [#]	0.0719
INDHOT	-0.1531 [*]	0.0616	-0.1535 [*]	0.0660	-0.0369	0.1689	-0.1732	0.2447	-0.0394	0.1251
INDTSC	0.0076	0.0348	-0.0864 [*]	0.0372	0.0273	0.0818	-0.0058	0.1181	0.0989	0.0687
INDFIN	0.1512 [#]	0.0573	0.0436	0.0700	0.1822	0.1012	0.0030	0.1560	0.2677 [#]	0.0909
INDSER	-0.0265	0.0284	0.0403	0.0337	0.1182 [*]	0.0506	0.0122	0.0791	-0.0589	0.0661
INDHHD	-0.3604 [#]	0.0518	-0.3232 [#]	0.0559	-0.3211 [#]	0.1052	0.5902 [*]	0.2948	-0.1619	0.3998
REGWC	-0.0261	0.0315	-0.1640 [#]	0.0501	-0.1398 [*]	0.0601	-0.1595	0.1294	-0.1305 [*]	0.0619
REGEC	-0.2677 [#]	0.0488	-0.2732 [#]	0.0556	-0.2993 [#]	0.0847	-0.0404	0.1568	-0.1413	0.0986
REGNC	-0.4225 [#]	0.0626	-0.4207 [#]	0.0765	-0.5358 [#]	0.0796	0.4562 [#]	0.1454	-0.7955 [#]	0.2378
REGFS	-0.4853 [#]	0.0496	-0.5246 [#]	0.0465	-0.5335 [#]	0.1778	-0.7529 [#]	0.1092	-0.3346 [#]	0.0789
REGKN	-0.1654 [#]	0.0340	-0.1711 [#]	0.0304	0.2145	0.1366	-0.2416 [#]	0.0783	-0.0986	0.0897
REGNW	-0.4521 [#]	0.0381	-0.3414 [#]	0.0367	-0.1112	0.2096	-0.0749	0.2659	-0.7158 [#]	0.1775
REGET	-0.3459 [#]	0.0474	-0.3559 [#]	0.0399	-0.3555 [*]	0.1461	-0.3500 [#]	0.1171	-0.2049 [*]	0.0859
REGNP	-0.5665 [#]	0.0405	-0.4417 [#]	0.0413	0.2050	0.1404	~	0.0000	-0.5307 [#]	0.1793
TUMEM	0.1086 [#]	0.0193	0.2369 [#]	0.0218	0.1777 [#]	0.0368	0.0764	0.0622	-0.0341	0.0479
Constant	0.2173	0.1243	-0.0549	0.1527	0.3782	0.2373	0.6994	0.3869	0.3945	0.4957
Model χ^2	1772052		854460		191735		63280		222235	

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

TABLE 2.98
HOURLY WAGE FUNCTIONS BY RACIAL GROUP 1998

Variable	Racial group									
	All		Black		Coloured		Asian		White	
	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
AGE	0.0547#	0.0093	0.0701#	0.0126	0.0335*	0.0141	0.0825#	0.0187	0.0909#	0.0161
AGESQ	-0.0005#	0.0001	-0.0007#	0.0002	-0.0002#	0.0002	-0.0009#	0.0003	-0.0009#	0.0002
EDPRIM	0.0287#	0.0082	0.0321#	0.0085	0.0351	0.0246	0.1208#	0.0328	-0.1263#	0.0282
EDSECO	0.1144#	0.0099	0.0646#	0.0104	0.0959#	0.0148	0.0519	0.0503	0.1522#	0.0307
EDTECH	0.2163#	0.0235	0.2081#	0.0304	0.2456#	0.0494	0.1212#	0.0379	0.1196#	0.0402
EDUNIV	0.1530#	0.0189	0.1173#	0.0371	0.1564#	0.0381	0.1169*	0.0541	0.1116#	0.0272
OCCPRO	0.4794#	0.0542	0.4422#	0.0657	0.2142*	0.0973	0.2707#	0.1023	0.3830#	0.0953
OCCMAN	0.5481#	0.0502	0.3825#	0.0846	0.3907#	0.0966	0.2507*	0.1266	0.3965#	0.0919
OCCCAT	0.0517	0.0433	0.0064	0.0456	0.0583	0.0942	0.0137	0.1601	0.0655	0.0950
OCCSSK	-0.0207	0.0424	0.0556	0.0516	-0.0674	0.1044	-0.1727	0.1706	-0.0364	0.1260
OCCUSK	-0.1862#	0.0460	-0.0915	0.0508	-0.4572#	0.1113	-0.3382*	0.1717	-0.1743	0.1948
INDEGW	0.2275*	0.1011	0.1382	0.1351	0.1845	0.1627	0.2154	0.1731	0.3106#	0.1203
INDCON	-0.0700	0.0596	-0.0465	0.0696	-0.0169	0.0932	0.0368	0.1511	0.0725	0.1543
INDWRT	-0.1443#	0.0452	-0.1720#	0.0555	-0.0685	0.1014	-0.1690	0.1549	-0.1014	0.0921
INDHOT	-0.2108#	0.0750	-0.2042*	0.0846	0.2460	0.1885	-0.4729#	0.0761	-0.1536	0.1510
INDTSC	-0.0255	0.0447	-0.1064	0.0558	0.1868	0.0978	0.0001	0.1530	0.0871	0.0638
INDFIN	0.0518	0.0794	0.1019	0.1216	0.2773#	0.0950	-0.0653	0.4058	-0.1243	0.1161
INDSER	-0.0379	0.0395	0.0462	0.0538	0.0955	0.0995	-0.0088	0.1250	-0.0739	0.0592
INDHHD	-0.8591#	0.0807	-0.8210#	0.0845	-0.5489*	0.2384	~	0.0000	~	0.0000
REGWC	0.1424*	0.0648	0.0826	0.0624	-0.0518	0.0820	-0.3688	0.2131	0.1873*	0.0895
REGEC	-0.1755	0.0907	-0.3473#	0.0607	-0.0245	0.1610	~	0.0000	0.2339*	0.0912
REGNC	-0.1226	0.0675	-0.1731	0.0995	-0.4245#	0.1032	-1.4599#	0.1557	0.0914	0.1056
REGFS	-0.4202#	0.0881	-0.5172#	0.0668	-0.5795#	0.0737	~	0.0000	-0.0057	0.0781
REGKN	-0.1491*	0.0594	-0.1647#	0.0491	0.0767	0.1658	-0.9326#	0.1827	-0.0178	0.1116
REGNW	-0.2874#	0.0641	-0.2790#	0.0604	-0.3234	0.2161	-0.4157	0.2489	-0.0343	0.1127
REGET	-0.1968#	0.0681	-0.1769*	0.0696	-0.2977*	0.1282	-1.1878#	0.2708	0.0464	0.1371
REGNP	-0.5220#	0.0668	-0.4717#	0.0661	-0.0133	0.1316	-1.0684#	0.1878	0.0321	0.1898
TUMEM	0.1653#	0.0259	0.2825#	0.0311	0.1333	0.0724	0.2260	0.1332	0.1110	0.0575
Constant	0.3344	0.1927	-0.0059	0.2505	0.9778#	0.3000	0.5103	0.4453	0.9252#	0.2818
Model χ^2	1606191		753731		188537		76887		242279	

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

TABLE 2.99
HOURLY WAGE FUNCTIONS BY RACIAL GROUP 1999

Variable	Racial group									
	All		Black		Coloured		Asian		White	
	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
AGE	0.0676#	0.0098	0.0775#	0.0104	0.0882#	0.0165	0.1176#	0.0356	0.0893#	0.0210
AGESQ	-0.0006#	0.0001	-0.0007#	0.0001	-0.0009#	0.0002	-0.0013#	0.0005	-0.0010#	0.0003
EDPRIM	0.0209#	0.0077	0.0209#	0.0077	0.0595*	0.0255	-0.2516#	0.0870	0.1759	0.1744
EDSECO	0.1179#	0.0078	0.0806#	0.0087	0.0624#	0.0164	0.0297	0.0307	0.0594*	0.0295
EDTECH	0.1844#	0.0275	0.2840#	0.0380	0.1706*	0.0765	0.0950	0.0595	0.0709	0.0432
EDUNIV	0.1583#	0.0145	0.1726#	0.0207	0.2422#	0.0409	0.1896#	0.0534	0.0955#	0.0224
OCCPRO	0.4564#	0.0423	0.3272#	0.0558	0.0968	0.1093	0.2680*	0.1364	0.4177#	0.0738
OCCMAN	0.6755#	0.0525	0.4350#	0.0808	0.4199#	0.1560	0.6928#	0.1765	0.5202#	0.0913
OCCCAT	0.0940*	0.0420	0.0039	0.0513	0.0231	0.0969	0.2315*	0.1148	0.1467	0.0944
OCCSSK	-0.0876*	0.0387	-0.0333	0.0441	-0.0705	0.0890	-0.1488	0.1342	-0.3011*	0.1213
OCCUSK	-0.1672#	0.0425	-0.0984*	0.0495	-0.3790#	0.0848	-0.2267	0.2147	-0.2135	0.1586
INDEGW	0.1908*	0.0923	0.2956#	0.1121	0.0129	0.2663	0.1921	0.1348	-0.0876	0.1403
INDCON	-0.2642#	0.0540	-0.1325*	0.0559	-0.2275*	0.1131	-0.7803	0.5449	-0.5050	0.2837
INDWRT	-0.1942#	0.0411	-0.2058#	0.0490	-0.0761	0.0812	-0.1771	0.1360	-0.1898*	0.0944
INDHOT	-0.3441#	0.0783	-0.3076#	0.0938	0.0105	0.1383	-0.8292#	0.1636	-0.3759*	0.1616
INDTSC	0.0364	0.0434	-0.0174	0.0524	0.1269	0.0733	0.3256*	0.1461	0.0417	0.0935
INDFIN	0.2029#	0.0782	0.0826	0.1234	0.0355	0.1202	0.4340	0.2841	0.1303	0.1275
INDSER	-0.0325	0.0374	0.0079	0.0431	0.0459	0.0648	0.1298	0.1386	-0.0360	0.0922
INDHHD	-0.7521#	0.1108	-0.7295#	0.1186	-0.4161	0.2396	-1.0647#	0.2264	~	0.0000
REGWC	0.1400#	0.0407	-0.0128	0.0526	0.0081	0.1052	-0.1543	0.3306	0.0786	0.0771
REGEC	-0.3560#	0.0622	-0.4833#	0.0628	-0.3673#	0.1415	0.4502	0.4693	-0.2147*	0.0955
REGNC	-0.0896	0.0767	0.1067	0.1098	-0.3954*	0.1556	0.6617#	0.2105	-0.2176	0.1455
REGFS	-0.4299#	0.0605	-0.4906#	0.0594	-0.4376	0.2447	-0.1193	0.1973	-0.2533*	0.1040
REGKN	-0.1608#	0.0455	-0.1688#	0.0463	0.0313	0.2235	-0.0107	0.1857	-0.2195	0.1765
REGNW	-0.2806#	0.0494	-0.1893#	0.0473	-0.5239*	0.2532	-0.4431*	0.2195	-0.3280	0.1702
REGET	-0.2863#	0.0566	-0.2793#	0.0536	-1.0141#	0.2932	0.2071	0.3015	-0.1341	0.1159
REGNP	-0.4677#	0.0583	-0.3852#	0.0612	-1.5421#	0.1482	-1.1097#	0.2756	-0.6274#	0.1648
TUMEM	0.1920#	0.0263	0.2990#	0.0291	0.1621#	0.0622	0.3418#	0.0906	-0.0082	0.0660
Constant	0.1937	0.2100	-0.0771	0.2153	-0.0890	0.3587	1.5550	0.8955	-0.3433	1.3433
Model χ^2	1432076		730940		157678		67933		203720	

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

TABLE 2.00
HOURLY WAGE FUNCTIONS BY RACIAL GROUP 2000

Variable	Racial group									
	All		Black		Coloured		Asian		White [†]	
	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
AGE	0.0753 [#]	0.0073	0.0741 [#]	0.0084	0.0890 [#]	0.0147	0.0825 [#]	0.0261	0.1111 [#]	0.0170
AGESQ	-0.0007 [#]	0.0001	-0.0007 [#]	0.0001	-0.0009 [#]	0.0002	-0.0007 [*]	0.0003	-0.0012 [#]	0.0002
EDPRIM	0.0336 [#]	0.0080	0.0339 [#]	0.0078	0.0414 [#]	0.0152	-0.2285 [#]	0.0696	~	0.0000
EDSECO	0.1326 [#]	0.0068	0.0723 [#]	0.0072	0.1025 [#]	0.0181	0.1105 [#]	0.0318	0.1390 [#]	0.0333
EDTECH	0.2462 [#]	0.0248	0.2609 [#]	0.0284	0.1467 [#]	0.0493	0.2331 [#]	0.0775	0.1354 [#]	0.0371
EDUNIV	0.1985 [#]	0.0150	0.1989 [#]	0.0248	0.1742 [#]	0.0349	0.1138 [#]	0.0441	0.1416 [#]	0.0203
OCCPRO	0.3376 [#]	0.0451	0.2947 [#]	0.0578	0.3500 [#]	0.0815	0.0328	0.1227	0.1970 [#]	0.0729
OCCMAN	0.7388 [#]	0.0603	0.7070 [#]	0.1112	0.5335 [#]	0.1137	0.2090	0.1313	0.4412 [#]	0.0860
OCCCAT	0.0506	0.0379	0.0290	0.0418	-0.0657	0.0855	0.0506	0.1076	0.1280	0.0819
OCCSSK	-0.0580	0.0352	0.0287	0.0359	-0.0794	0.0862	-0.1823	0.1028	-0.0849	0.1388
OCCUSK	-0.1656 [#]	0.0345	-0.0641	0.0359	-0.1985 [*]	0.0870	-0.3558 [*]	0.1566	-0.3162	0.2379
INDEGW	0.1731 [*]	0.0768	0.2685 [#]	0.0904	0.1887	0.1513	0.3517 [#]	0.0997	-0.0622	0.1795
INDCON	-0.1840 [#]	0.0419	-0.1343 [#]	0.0459	-0.1788 [*]	0.0891	0.3361 [*]	0.1642	0.0326	0.1177
INDWRT	-0.1933 [#]	0.0366	-0.2282 [#]	0.0392	-0.1405 [*]	0.0599	-0.3290 [*]	0.1458	-0.1588 [*]	0.0773
INDHOT	-0.2784 [#]	0.0642	-0.1561 [*]	0.0641	-0.4075	0.2105	0.0702	0.3304	-0.4974 [#]	0.1310
INDTSC	-0.0332	0.0396	-0.0546	0.0458	0.0560	0.0822	-0.0116	0.0837	-0.0698	0.0944
INDFIN	0.2923 [#]	0.0717	0.3928 [#]	0.1070	0.0846	0.1655	0.1985	0.2200	0.1889	0.1077
INDSER	-0.0697 [*]	0.0346	0.0237	0.0378	-0.0957	0.0766	-0.0403	0.1282	-0.0689	0.0763
INDHHD	-0.7849 [#]	0.1318	-0.6539 [#]	0.1517	-1.3479 [#]	0.1256	~	0.0000	-1.6786 [#]	0.2606
REGWC	0.1945 [#]	0.0363	-0.0403	0.0475	0.0762	0.0958	-0.3729	0.2138	0.0601	0.0788
REGEC	-0.0996 [*]	0.0483	-0.1785 [#]	0.0484	-0.1438	0.1351	-0.1095	0.2306	-0.0663	0.0861
REGNC	-0.0526	0.0750	-0.1514	0.1117	-0.1739	0.1340	~	0.0000	-0.2383	0.1324
REGFS	-0.2673 [#]	0.0591	-0.3139 [#]	0.0608	-0.4139	0.3226	-0.1687	0.1984	-0.1174	0.0893
REGKN	-0.0874 [*]	0.0370	-0.1255 [#]	0.0359	-0.0384	0.1741	-0.2003	0.1617	0.0049	0.0839
REGNW	-0.1599 [#]	0.0499	-0.1020 [*]	0.0432	-0.5984	0.4052	-0.6355 [*]	0.2481	-0.0342	0.1327
REGET	-0.1513 [#]	0.0575	-0.1965 [#]	0.0472	0.2556	0.3573	0.1778	0.1450	0.0820	0.1143
REGNP	-0.5355 [#]	0.0524	-0.4464 [#]	0.0525	-1.5343 [#]	0.1400	-1.0669 [#]	0.2395	-0.2375	0.1805
TUMEM	0.2616 [#]	0.0263	0.4361 [#]	0.0277	0.2623 [#]	0.0518	0.1599 [*]	0.0658	-0.0298	0.0669
Constant	-0.1987	0.1482	-0.2215	0.1681	-0.1031	0.3316	2.0427 [#]	0.6234	0.1105	0.3480
Model χ^2	2155069		1008982		243406		121907		327529	

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

[†] All Whites have 7 years of primary education, which is therefore defined as the base case for this group in 2000 only.

TABLE 2.01
HOURLY WAGE FUNCTIONS BY RACIAL GROUP 2001

Variable	Racial group									
	All		Black		Coloured		Asian		White	
	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
AGE	0.0716#	0.0073	0.0859#	0.0080	0.0610#	0.0203	0.1179#	0.0225	0.0846#	0.0182
AGESQ	-0.0006#	0.0001	-0.0009#	0.0001	-0.0006	0.0003	-0.0013#	0.0003	-0.0009#	0.0002
EDPRIM	0.0279#	0.0073	0.0184*	0.0072	0.0769*	0.0316	-0.0108	0.0416	0.0276	0.0525
EDSECO	0.1337#	0.0079	0.0852#	0.0078	0.0614#	0.0174	0.1070#	0.0274	0.1365#	0.0345
EDTECH	0.1768#	0.0207	0.2046#	0.0272	0.2130#	0.0393	0.2468#	0.0469	0.1248#	0.0400
EDUNIV	0.1577#	0.0124	0.1870#	0.0157	0.1791#	0.0273	0.1275#	0.0353	0.1084#	0.0213
OCCPRO	0.4769#	0.0398	0.4193#	0.0518	0.3551#	0.0832	0.2410#	0.0741	0.3265#	0.0813
OCCMAN	0.8151#	0.0548	0.7580#	0.1018	0.5761#	0.1008	0.4558#	0.1416	0.5212#	0.0894
OCCCAT	0.0804*	0.0389	0.0529	0.0432	0.0147	0.0693	0.0805	0.1117	0.1029	0.0872
OCCSSK	-0.1349#	0.0388	0.0189	0.0412	-0.1313	0.0740	-0.1246	0.0923	-0.2256*	0.1056
OCCUSK	-0.1958#	0.0372	-0.0901*	0.0396	-0.2978#	0.0729	0.1323	0.1217	0.2196	0.1153
INDEGW	0.1267	0.0816	0.2518#	0.0874	0.3582	0.1887	0.0636	0.2853	-0.2990	0.1955
INDCON	-0.2374#	0.0439	-0.1064*	0.0495	-0.2178	0.1129	0.0269	0.1158	-0.3496#	0.1329
INDWRT	-0.3096#	0.0351	-0.3072#	0.0426	-0.2608#	0.0651	-0.0970	0.0903	-0.2885#	0.0852
INDHOT	-0.2516#	0.0773	-0.0503	0.0841	0.1444	0.2356	-0.2218	0.2445	-0.6021*	0.2393
INDTSC	-0.0940*	0.0377	-0.1378#	0.0498	0.1386*	0.0631	0.1227	0.1064	-0.0953	0.0765
INDFIN	0.1586	0.0907	0.2347*	0.1105	0.1681	0.1182	0.1864	0.1571	0.1376	0.1574
INDSER	-0.1262#	0.0342	0.0286	0.0400	-0.0464	0.0593	-0.0554	0.0844	-0.1946*	0.0877
INDHHD	-0.7635#	0.1001	-0.6245#	0.0928	-1.0943#	0.1400	-0.7098#	0.2289	-2.2817#	0.1369
REGWC	0.1128#	0.0399	-0.0903	0.0550	-0.1229	0.0957	-0.1210	0.1991	0.0146	0.0801
REGEC	-0.2528#	0.0590	-0.4170#	0.0608	-0.2626*	0.1156	-0.3506	0.4243	-0.0190	0.0890
REGNC	-0.1246	0.0636	-0.3324#	0.0864	-0.3994#	0.1212	~	0.0000	-0.1607	0.1071
REGFS	-0.2948#	0.0570	-0.3331#	0.0558	-0.4529	0.2453	-0.3335	0.4066	-0.2058*	0.1045
REGKN	-0.1580#	0.0375	-0.1673#	0.0365	0.0954	0.1356	-0.3828*	0.1528	-0.0998	0.0930
REGNW	-0.2688#	0.0446	-0.2203#	0.0414	-0.1264	0.1685	-0.0209	0.1632	-0.0777	0.1264
REGET	-0.1805#	0.0587	-0.2182#	0.0471	-0.4836#	0.1346	0.1801	0.3016	0.0987	0.1099
REGNP	-0.6814#	0.0506	-0.5896#	0.0530	~	0.0000	-0.1345	0.1829	-0.3721*	0.1631
TUMEM	0.2702#	0.0246	0.3773#	0.0287	0.1666#	0.0537	0.2091#	0.0694	0.1641#	0.0593
Constant	0.0626	0.1505	-0.2322	0.1677	0.5016	0.4033	0.0539	0.4771	0.4437	0.4529
Model χ^2	2094236		1116698		221197		105726		252478	

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