

Wage effects of on-the-job training for South African workers

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Abstract

The paper offers an empirical analysis of the wage effects of on-the-job training on individual worker wage growth for South African black and white workers. The empirical analysis allows for an assessment of the extent to which the two key components of wage growth, returns to labour market experience and firm tenure, contribute to the gender and racial wage differentials that underpin South Africa's high income inequality. Using nationally representative household panel data from Statistics South Africa, our estimates suggest that black women earn more from an additional year with the same firm (i.e. tenure) and less from labour market experience. This suggests that wage growth for black women is tied to the current firm and that they experience a much larger penalty when transitioning between firms. In contrast, an additional year of firm tenure and labour market experience brings about roughly similar wage gains for black men. On the other hand, white men and women gain more from an additional year of labour market experience and less from firm tenure. Further analyses, using instrumental variables and control function approach, reveal that there is greater uncertainty on the part of the employer concerning the expected productivity of job matches entered into with black women and this places them at a disadvantage at the hiring stage. Accounting for the uncertainty and unobserved heterogeneity in worker-firm match quality suggests that the returns to firm tenure are small and not significantly different by gender or race. The gap in the wage returns to labour market experience was also found to be largely related to the widening gap between "potential" and "actual" labour market experience caused by rising unemployment and differences in labour force attachment among the groups. The paper, therefore, proposes a strategy for adjusting for the discrepancy in potential experience in survey data sets used for labour market analysis that do not contain measures of actual experience.

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1. Introduction

The human capital theory postulates that with an additional year of labour market experience a worker is able to accumulate skills that are thought to be beneficial to the worker in any firm. On the other hand, an additional year with the same firm allows the worker to accumulate skills that are beneficial only with the current firm. These skills, together with the skills learned at school in preparation for entry into the labour market, enable the worker to be more productive and thus improve their earnings potential and contribute to earnings growth over the life-cycle. The developing country literature on the determinants of earnings has tended to focus more on the role of schooling as a source of skills and on its role in determining individual earnings. In this paper, attention is given to labour market experience and firm tenure in an attempt to fill the gap in the literature on earnings in South Africa and developing country context more generally. We are specifically interested in knowing what happens to wages as a worker accumulates an additional year of labour market experience or when the worker is employed with the same employer for an additional year. We estimate these wage effects for black and white men and women in the South African labour market.

The returns to labour market experience and firm tenure are two key components of the dynamic structure of wages (Williams, 1991) and are thus important in understanding how individual wages grow over time. Wage growth among individuals and groups is of particular interest for South African policy makers as they still grapple with high income inequality that is mainly driven by wage patterns in the labour market (Leibbrandt et al, 2010; and van der Berg, 2014). Moreover, an analysis of the effects of labour market experience and firm tenure on wages may improve our assessments of the costs of youth unemployment. These young people, while unemployed, miss out on an opportunity to accumulate skills and increase their human capital stock. These young people's future earnings potential are therefore less than what they could have been.

The main objective of this paper is to provide a causal estimation of the effects of labour market experience and firm tenure on wages. The causal analysis is, however, complicated by the existence of unobserved heterogeneity in the quality of individual workers and in the quality of worker-firm matches (Abraham and Farber, 1987; Altonji and Shakotko, 1987; Garen, 1989; and Topel, 1991). The complication arises because the unobserved heterogeneity is correlated to labour market experience and firm tenure, and introduces bias in the estimation of the effects of interest. A further complication arises because of the lack of direct measures of actual labour market experience in the survey data sets we have available to analyse the South African (and developing country) labour markets. A common solution which has become standard practice is to proxy for actual experience with potential experience measured as age minus years of schooling minus six (Mincer, 1974). But during periods of rising unemployment, a wedge is driven between actual and potential experience,

which makes it even more difficult to accurately estimate the casual effects of labour market experience and firm tenure. This paper endeavours to address these challenges by using data and estimators that explicitly address the abovementioned challenges.

Our estimates based on ordinary least squares (OLS) estimation suggests that black women gain more from an additional year with the same firm (i.e. tenure) and less from labour market experience. In contrast, an additional year of firm tenure and labour market experience brings about roughly similar wage gains for black men. On the other hand, white men and women gain more from an additional year of labour market experience and less from firm tenure. Further analyses, using instrumental variables and control function approach, reveal that there is greater uncertainty on the part of the employer concerning the expected productivity of job matches entered into with black women and this places them at a disadvantage at the hiring stage. Accounting for the uncertainty and unobserved heterogeneity in worker-firm match quality suggests that the returns to firm tenure are small and not significantly different by gender or race. The gap in the wage returns to labour market experience was also found to be largely related to the widening gap between “potential” and “actual” labour market experience caused by rising unemployment and differences in labour force attachment among the groups.

2. Literature review

This paper focuses on two key components of wage growth – returns to labour market experience and returns to firm tenure – and their effect on the racial and gender earnings gap over the life-cycle.² The literature on individual wage growth is dominated by the human capital model that places skills accumulation and productivity growth over the life-cycle as the key explanation for wage growth. Alternative explanations are put forward by the sorting, learning and matching models. These models emphasise imperfect information, implicit contracts and principal-agent considerations in the employer-employee relationship as the key drivers of wage growth over the life-cycle.

A key distinction underlying the differences in the human capital model and the second group of models is the role assigned to individual worker productivity growth as the key driving force behind the observed pattern of individual wages over the life-cycle. As such we will classify the different models into *productivity-based* and *non-productivity based* models.³ This is a crude classification that

² Attention here is restricted to the post-schooling phase of the life-cycle, we do not consider experience and tenure accumulated while at school that has been identified as being important in accurately estimating the returns to schooling and labour market experience by Light and Ureta (1995) and Light (1998).

³ This classification is adopted from Harris and Holstrom (1982).

groups models based on their reliance and emphasis, or lack thereof, on productivity growth as the key driving force behind the growth of individual wages over the life-cycle. This classification is used here mainly as a tool for organising the different models to be discussed. We begin the discussion with the *productivity-based* model – human capital model – followed by the *non-productivity based* models. We conclude the section with a brief review of the South African literature on wage growth inferred from studies utilising earnings functions.

2.1 Productivity-based models

Under the human capital model, schooling and on-the-job training are two channels through which individuals make productivity-enhancing investments. Schooling teaches skills to individuals in preparation for entry into the labour market. Skills learned at school are then adapted, enhanced, and new ones acquired while on the job (Becker, 1962). The increased stock and efficiency of skills enables the worker to be more productive. This in turn improves the worker's earnings potential since, under this model, wages are assumed to reflect a worker's productivity.

Becker (1962) argued that an individual will devote a large portion of his initial stages of the life cycle investing in human capital. This is because young individuals have a longer expected working period over which to collect the returns on their investments. Subsequent stages will be characterised by gradual decreases in investments until no further investments are made. The rate of investment declines because the opportunity cost of further investments increases and also because the working period over which to enjoy the benefits of further investments becomes shorter and shorter. Further theoretical work by Ben-Porath (1967) illustrated that these incentives produce life-cycle productivity profiles that are concave.

The human capital model enjoys a great deal of empirical support. Seminal contributions by Altonji and Shakotko (1987), Topel (1991) and Altonji and Williams (2005) are among a large group of papers that provide empirical support for the importance of firm tenure and labour market experience for individual worker wage growth. More recent studies contend that skill accumulation is not simply firm-specific or general; these studies illustrate the importance of occupation and industry experience in the accumulation of skills and determining individual worker wage growth over the life cycle (Neal, 1995; Parent, 2000; Sullivan, 2010; and Nawakitphaitoon, 2014).

2.2 Non-productivity based models

Other theoretical models have made similar predictions about the growth of individual wages over the life-cycle, but with different explanations regarding the process underlying the growth of wages. In Jovanovic's (1979) job matching model of labour turnover, the productivity of a given worker in a given job is unknown *ex ante* by neither employer nor employee and this gives rise to uncertainty

about the quality of the worker-firm match. This uncertainty is resolved through a learning process in which the worker's output is observed by the firm over time. Firms value workers with whom they are well matched with and will offer higher wages to such workers, while paying relatively lower wages to workers who are revealed to be of low productivity and a poor match with the firm. Thus individual wages are an increasing function of firm tenure because workers that are well matched will accumulate longer tenure spells while poorly matched workers move on to other firms. Wages are also predicted to increase with labour market experience since tenure is correlated with labour market experience, and worker movements are expected to result in improved matches over the life-cycle.

In Salop and Salop's (1976) model, it is shown that firms offer wages that increase with tenure over the life cycle as a self-selection mechanism that ensures the credibility of information conveyed by job applicants. Faced with high turnover costs when employees quit, the firm would ideally like to employ those employees with lower inclinations to leave the firm prematurely. By offering initially low – but predictably increasing – wages, the firm induces workers to reveal their privately held quit-propensities and ensures that workers with high quit-propensities self-select themselves out of jobs offering upwardly-sloping wage-tenure profiles. This implies that wages may increase with tenure independently from productivity increases.

The above models emphasise the importance and consequences of imperfect information in the employer-employee relationship. The next model demonstrates that positively sloped wage-earnings profiles may also be accounted for by firms' attempts at overcoming principal-agent problems that often characterise an employer-employee relationship. In Lazear's (1981) model, it is showed to be an optimal strategy for a firm to pay lower wages in the early stages of the life cycle or pay junior workers less than their senior counterparts. This incentivises less shirking on the job and ensures that workers supply optimal levels of effort.

While the theoretical foundations of these models differ regarding the process of individual worker wage growth over the life-cycle, they however make similar predictions regarding the relative rate of return to labour market experience and firm tenure between men and women. Put together, these models predict that women will have higher wage returns to labour market experience and lower wage returns to firm tenure compared to men (Munasinghe, Reif, and Henriques, 2008). This is due to women's lower labour market attachment that incentivises them to invest in general skills as opposed to firm-specific skills, and to self-select out of jobs with back-loaded compensations (Munasinghe, Reif, and Henriques, 2008).

2.3 South African literature

The theoretical literature reviewed above is mainly based on the United States of America (or more generally on a developed country context). Developing country labour markets are different in interesting ways that may influence the way we conceptualise and interpret many labour market theories and the way we empirically estimate the validity of those theories. With the greater policy focus on schooling and its role in determining earnings, there has been little research focus in developing countries on the wage effects of firm tenure and labour market experience.

In the South African context, earnings functions have emerged as the dominant tool available to researchers for analysing South African labour market earnings dynamics. This research usually involves estimating and interpreting earnings functions to identify and explain factors that determine wages. This research can broadly be grouped into studies that focus on the effects of schooling on wages (see for example Keswell and Poswell, 2004; and Mwabu and Schultz, 2000), and studies that focus on earnings inequality between groups of workers (see for example Allanson et al, 2002; Grun, 2004; Rospabe, 2002; and Sherer, 2000).

Unfortunately, there is very little that can be inferred about the causal effect of firm tenure and labour market experience from these studies. This is because tenure and experience are included in the earnings functions as control variables and as such no attempts are made to address any bias that might affect the estimates of these parameters. In this analysis we attempt to fill this void by focusing on labour market experience and firm tenure as our variables of interest in the earnings functions.

3. Methodology and data

The goal of this paper is to determine the contribution of labour market experience and firm tenure (or seniority) on individual worker wage growth for black and white South African men and women. As a point of departure for the empirical analysis we rely on Mincerian earnings functions for our four groups estimated separately by pooled OLS. Labour market experience and firm tenure serve as our variables of interest in these earnings equations. Labour market experience is measured in our dataset as 'age minus years of schooling completed (i.e. education) minus six' while firm tenure is measured as the number of years that a worker has worked for the same employer. Other variables we control for in the earnings regression include education, province, rural/urban status, household head, marital status, firm size, union status, and wave fixed effects. The remainder of this section introduces the dataset that the empirical analysis of the next section is based on.

The analysis in the next section makes use of the Labour Force Surveys (LFSs) conducted by Statistics South Africa (Stats SA). The LFSs are nationally representative cross-sectional household surveys

that are meant to monitor developments in the South African labour market. The surveys were conducted twice yearly – March and September – from September 2000 to September 2007. The LFSs were designed as a rotating panel of dwelling units with 20% of these units dropped in subsequent waves and replaced with new dwelling units (Stats SA, 2006). The rotations were designed in such a way that a total sample of 30 000 households was maintained in each wave.

For the empirical analysis we pooled together the individual cross-sectional surveys running from September 2001 to March 2004. We focus on these waves because they correspond to Stats SA's Labour Force Survey Panel (LFSP) that is also used for the analysis in the next section. The LFSP was constructed after the collection, processing and release of the individual LFS waves (Stats SA, 2006). The LFPS was constructed afterwards because the original LFSs were only initially intended as a rotating panel of dwelling units and not of individuals or households (Stats SA, 2006).

The estimation sample was restricted to black and white men and women between the ages of 16 and 65. Workers in subsistence agriculture and those reporting to be self-employed were excluded from the analysis. Table 1 below provides a summary of the descriptive statistics for some of the key variables in our analysis. From the Table we see that there's a large racial gap in real hourly wages but that such gap is smaller across genders but still significant among white workers. For instance, the average hourly wage rate for white men is roughly four times of that for black men. The racial and gender gaps in wages is a key part of the motivation for this paper. In particular, we are interested in determining how these wage gaps evolve as workers accumulate additional years of labour market experience and firm tenure.

Table 1: Descriptive statistics (Stats SA LFS, 2001B-2004A)

Variables	Black women	Black men	White women	White men
Real hourly wage	8.54 (13.13)	9.77 (13.59)	26.11 (24.96)	38.59 (43.96)
Potential experience	24.00 (12.09)	23.74 (12.37)	19.93 (11.19)	21.19 (11.22)
Schooling (completed years)	8.57 (4.20)	8.09 (4.09)	12.40 (1.69)	12.30 (1.83)
Age	38.69 (10.11)	38.08 (10.29)	38.32 (11.05)	39.32 (11.08)
Employment tenure	6.60 (7.07)	7.58 (7.81)	7.02 (7.01)	8.58 (8.37)

Notes: Own calculations. Standard deviations in parentheses.

According to our measure of labour market experience, which is a combination of an individual's age and completed years of education, black workers have roughly 3 more years of labour market experience compared to their white counterparts. This reflects the lower average completed years of

education for black workers – 9 years compared to 12 years for white workers in our sample. There are no significant differences in age.

Black women have the lowest measured average years of firm tenure (at 6.6 years) while white men have the highest average years of firm tenure at 8.58 years. This may suggest greater mobility for black women either within or out of the labour market. The next section will estimate the wage effects of both labour market experience and firm tenure for black and white South African men and women.

4. Empirical analysis

This section will report and discuss the results of the empirical analysis regarding the wage effects of labour market experience and firm tenure on the expected average wages of black and white South African men and women. Section 4.1 below presents and discusses the first set of results obtained from pooled OLS estimation of the log hour hourly wage equation. From these results, three hypotheses are derived and empirically tested in section 4.2. These hypotheses serve as potential explanations for the results presented in section 4.1. Section 4.3 provides a summary of the results.

4.1 Pooled OLS results

In this section we report results from log hourly wage regressions using pooled OLS. Separate regressions were estimated for all four groups with labour market experience and firm tenure as the variables of interest. These results are contained in Table 2 below. For the sake of brevity, Table 2 only shows point estimates for labour market experience; firm tenure; and schooling specified as a spline with knots at 7 years (completed primary), 12 years (completed secondary) and tertiary which is more than 12 years of schooling; and a constant (intercept).

Table 2 and all tables to follow (unless otherwise indicated) organise the results in the following manner: Column 1 presents the results for black women followed by results for black men, white women and then white men in the last column. Consequently, a movement from the first to the last column mimics the stereotypical racial and gender hierarchy in labour market outcomes in South Africa with black women as the least advantaged and white men as the most advantaged of all groups. It will thus be interesting to see if the returns to labour market experience and firm tenure display this pattern.

Table 2: Log Hourly Wage Regression – Pooled OLS (Stats SA LFS, 2001B-2004A)

	Black women	Black men	White women	White men
Potential experience	0.0184 (0.0025)**	0.0309 (0.0023)**	0.0357 (0.0049)**	0.0284 (0.0054)**
Potential experience ²	-0.0001 (0.00004)**	-0.0004 (0.00004)**	-0.0007 (0.0001)**	-0.0006 (0.0001)**
Tenure	0.0449 (0.0027)**	0.0401 (0.0022)**	0.0247 (0.0054)**	0.0297 (0.0050)**
Tenure ²	-0.0011 (0.0001)**	-0.0008 (0.0001)**	-0.0004 (0.0002)*	-0.0005 (0.0002)**
Primary schooling	0.0277 (0.0037)**	0.0363 (0.0036)**	0.0432 (0.0759)	0.0050 (0.0329)
Secondary schooling	0.1799 (0.0052)**	0.1571 (0.0043)**	0.2123 (0.0271)**	0.2231 (0.0210)**
Tertiary schooling	0.3840 (0.0117)**	0.4062 (0.0104)**	0.1494 (0.0132)**	0.1853 (0.0118)**
Constant	0.1679 (0.0476)**	0.0071 (0.0501)	0.9034 (0.5175)	1.4901 (0.2439)**
<i>R</i> ²	0.60	0.54	0.29	0.35
<i>N</i>	22,013	26,429	4,601	4,938

Controls: province; rural/urban status; household head; marital status; firm size; union status; and wave fixed effects

Robust standard errors in parentheses

* $p < 0.05$; ** $p < 0.01$

The estimated coefficients for the variables of interest exhibit statistically positive but diminishing wage returns for all four groups. A closer inspection of the results in Table 2 reveal an interesting pattern of wage returns to labour market experience and firm tenure with a clear division along racial lines. For black workers, an additional year of firm tenure is more valuable than an additional year of labour market experience. The opposite is true for white workers with an additional year of labour market experience having a larger wage effect.

While there appears to be a different overall pattern of wage returns for the two race groups, an interesting picture emerges for black women. Black women have the smallest estimated wage return to labour market experience compared to the other three groups who roughly have similar returns. The point estimate for the linear experience term for black women is 0.0184 compared to 0.0309, 0.0357 and 0.0284 for black men, white women and white men, respectively. The point estimate for the squared experience term for black women, however, suggests that the returns to labour market experience diminish at a much slower rate than for the other groups.

Turning attention to the returns to firm tenure, a different picture emerges between the four groups. An additional year with the same employer has the largest wage effect for black women. White women and men have the smallest estimated wage effect. Black men lie somewhere in the middle. This is in stark contrast to the pattern of wage returns uncovered for labour market experience.

Table 2 reported separate log hourly wage regressions for black and white workers estimated with pooled OLS. From these results we draw the following two related findings about the wage effects of labour market experience and firm tenure. Firstly, an additional year of firm tenure contributes more to average wage growth of black workers, and white workers derive much greater wage growth from an additional year of labour market experience. Secondly, black women have the largest estimated returns to firm tenure and the smallest returns to labour market experience. In the next section we investigate these results more closely and derive and empirically test three hypotheses that account for and serve as potential explanations for these results.

4.2 Accounting for the wage-experience and wage-tenure profiles

The results presented above provide evidence of statistically and economically significant contributions of firm tenure and labour market experience to individual average wage growth for black and white South African workers. However, interesting group differences in the wage effects of labour market experience and firm tenure emerged. In this section we derive, empirically test and advance three hypotheses that account for and serve as explanations for these results. The first hypothesis asks to what extent the flatter wage-experience profile of black women relative to the other groups reflects lower labour market attachment for black women which in turn drives a wedge between ‘actual’ and ‘potential’ labour market experience.

The second hypothesis recognises that there may be important differences in the wage structures faced by workers in different occupations and industries that may influence the wage-tenure and wage-experience profiles faced by these workers. Moreover, there are systematic racial and gender differences in occupation and industry choices among South African workers related to schooling choices, preferences and other constraints. With this in mind, the second hypothesis asks to what extent the results presented in the previous section reflect these differences in wage structures and self-selection between the different occupations and industries.

The last hypothesis uses insights from the job matching models *à la* Jovanovic (1979) and argues that there may be greater *ex ante* uncertainty around the expected productivity of black workers and that such uncertainty may be specific to the worker-firm match. Such uncertainty, it is argued, is largely driven by noisier labour market signals and weaker labour market attachment for black workers that lead to inferior information networks. Our third hypothesis, therefore, postulates that when such uncertainty is resolved through employer learning, there should be quicker within-firm wage growth for these workers which produces steeper wage-tenure profiles for black workers relative to their white counterparts. We expand and investigate the empirical relevance of these hypotheses below beginning with the first hypothesis.

4.2.1 Potential versus Actual labour market experience

The labour market experience accumulated by a worker is not observed by the econometrician and no direct measure exists in the data sets we have available to analyse the South African labour market. In our analysis thus far we have made use of ‘age minus years of schooling completed (i.e. education) minus six’ as a proxy measure for labour market experience in the absence of a direct measure. This proxy measure is usually dubbed as “potential” experience and was first suggested by Mincer (1974). This is essentially a measure of the time that has elapsed since an individual has left school (Regan and Oaxaca, 2009) and makes many assumptions that are hard to reconcile with workers’ labour market behaviour.

Potential experience assumes a continuous labour force attachment and does not distinguish between employment states – full-time employment versus part-time employment versus narrow or broad unemployment (Regan and Oaxaca, 2009). This is particularly problematic in the South African case since about a quarter of the labour force is unemployed and employment states exhibit strong racial and gender dimensionalities. Black men and women are on average more likely to be classified as narrowly unemployed and more likely to be discouraged than their white counterparts. Figure 1 below shows that black workers, especially black women, face a much lower probability of employment compared to their white counterparts. Moreover, the level of employment to which the four groups converge differs greatly. The speed of convergence also differs. This suggests that there are long periods of unsuccessful job search for black workers before they are absorbed into the labour market. This of course will have direct consequences for the amount ‘actual’ labour market experience that these workers accumulate.

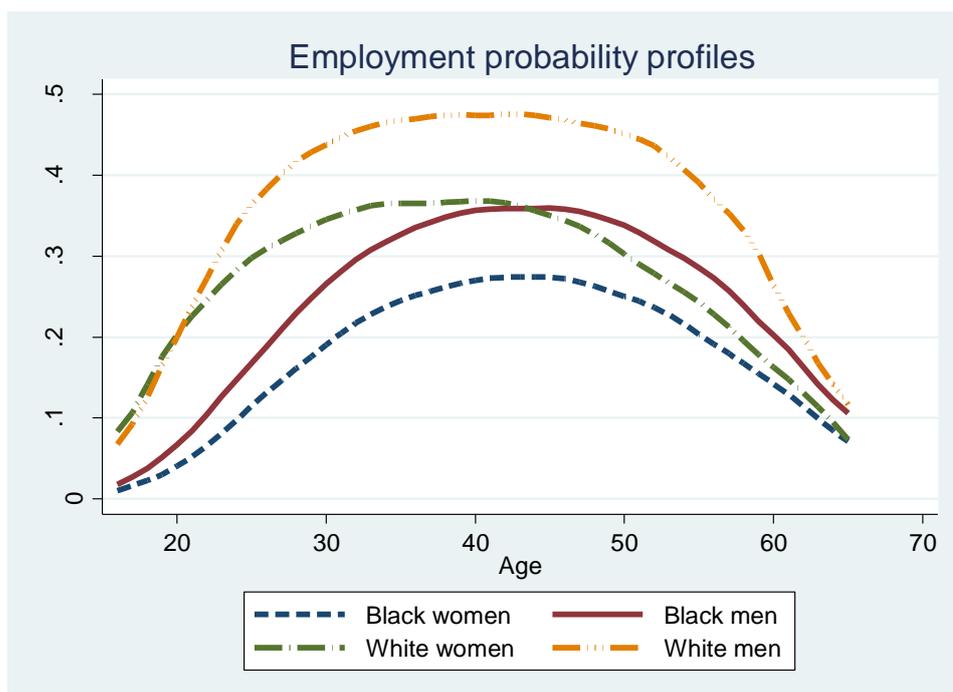


Figure 1

Potential experience also assumes that individuals take the same amount of time to complete a given level of school qualification. In other words, potential experience ignores grade repetition at school. Grade repetition is high in South Africa and has a racially skewed distribution with black individuals much more likely to repeat a grade than their white counterparts. So we would expect potential experience to systematically overstate actual labour market experience for black workers. In an earnings function, this would lead to a downward bias of the ‘true’ wage effect of labour market experience (Filer, 1993).

To correct for this, Elsby and Shapiro (2011) suggested adjusting the wage-experience profiles by the group specific employment rates. If we are willing to assume that employment is identically and independently distributed (i.i.d.) across workers at any given point in time, then the product of the employment rate and potential experience would be equal to actual experience for a given worker (Elsby and Shapiro, 2011). But Elsby and Shapiro (2011) point out that employment is in actual fact persistent rather than being an i.i.d. process. Consequently, adjusting potential experience by the employment rate yields an upper bound for the degree of discrepancy between potential and actual experience.

In adjusting for the discrepancy between potential and actual experience we followed Elsby and Shapiro’s (2011) strategy but with an important extension. Elsby and Shapiro’s (2011) adjustment factor for potential experience is derived from group specific employment rates. This means that each member of that group will have potential experience adjusted by the same factor (i.e. the group’s employment rate). Instead of group-specific employment rates, we estimate individual-specific employment rates that we use as our adjustment factor. Our individual-specific employment rates are derived from employment probit regressions with schooling (specified as a spline) and age (specified as a quadratic) as the regressors separately for each race and gender. We then use the coefficients to predict employment probability for each individual from the age of 16 until their present age (observed in the data). Following this, we then retrospectively and incrementally adjust potential by this individual-specific employment rate. The advantage of our extension is based on the use of more information (i.e. age and schooling) in deriving the adjustment factor.

Table 3: Mean values for experience variables

	Potential experience	Elsby & Shapiro (2011)	Predicted experience
Black women	24.00	7.20	6.78
Black men	23.74	9.73	9.22
White women	19.93	10.76	13.37
White men	21.19	15.68	17.19

Table 3 above compares mean values for potential experience, Elsby and Shapiro (2011) adjusted experience variable, and our predicted measure of experience that improves on Elsby and Shapiro's (2011) experience variable. We see from Table 3 that the average years of experience are drastically different depending on which measure of experience one considers.

Table 4: Potential experience vs Predicted experience

	Black women	Black men	White women	White men
Potential experience	0.0184 (0.0025)**	0.0309 (0.0023)**	0.0357 (0.0049)**	0.0284 (0.0054)**
Potential experience ²	-0.0001 (0.00004)**	-0.0004 (0.00004)**	-0.0007 (0.0001)**	-0.0006 (0.0001)**
<i>Predicted</i> experience	0.0654 (0.0035)**	0.0566 (0.0034)**	0.0523 (0.0063)**	0.0353 (0.0060)**
<i>Predicted</i> experience ²	-0.0024 (0.0002)**	-0.0018 (0.0001)**	-0.0015 (0.0002)**	-0.0009 (0.0001)**

Controls: tenure and tenure-squared; schooling province; rural/urban status; household head; marital status; firm size; union status; and wave fixed effects

Robust standard errors in parentheses

* p<0.05; ** p<0.01

It appears that the flatter wage-experience profile for black women is driven by their weaker labour market attachment. In other words, black women are penalised for the time they spend outside of the labour market and the unadjusted flatter wage-experience profile in Figure 1 does not account for this penalty.

In this section we investigated the possibility that the flatter wage-experience profile of black women relative to the other groups reflects lower labour market attachment for black women which in turn drives a wedge between 'actual' and 'potential' labour market experience. Figure 3 provided evidence in favour of this hypothesis. Namely, that accounting for the fact that black women spend relatively more time out of the labour market due to lower employment opportunities and greater household responsibilities, they in fact have a much steeper wage-experience profile. We now turn to the second hypothesis.

4.2.2 Adjusting for occupation and industry

One other potential explanation for the results presented in section 4.1 is that there may be systematic differences in the wage structure between occupations and industries that lead to different wage-experience and wage-tenure profiles. This is of relevance for our analysis because there exists systematic racial and gender differences in the absorption rates between different occupations and industries in the South African labour market. Table 3 below illustrates this point by collapsing the

10 occupation categories into three skills categories⁴ and then reporting the distribution across the three skills categories by gender and race. According to Table 3, about 54% of black women in our sample are absorbed into the unskilled category which comprises of domestic services and elementary occupations. White workers are absorbed into the semi-skilled and skilled occupations while black men are predominantly absorbed into the semi-skilled occupations. This strongly reflects the remnants of the racial hierarchy in occupation choices that was engineered by the Apartheid government's labour market policies designed to limit the labour market opportunities of black workers.

Table 5: Occupation grouping by level of skills, percentages

	Unskilled	Semi-skilled	Skilled
Black women	0.53	0.28	0.19
Black men	0.27	0.61	0.12
White women	0.2	0.55	0.43
White men	0.4	0.46	0.50

Notes: Own calculations from Statistics SA Labour Force Surveys, waves: 2001B-2004A.

Table 5 provides suggestive evidence for the importance of occupation choice for an analysis of racial and gender differences in labour market outcomes in South Africa. We therefore control for occupation and industry in our earnings regressions below. In Table 4 we estimate a single earnings regression and add gender and race as additional explanatory variables. Column A essentially reproduces the results obtained in Table 2⁵. We have interacted gender and race with the labour market experience and firm tenure variables. Black women are the reference category. Column A reiterates the findings of an additional year of firm tenure having the largest contribution to the wage growth of black women and an additional year of labour market experience having a smaller but still statistically significant contribution.

In column B we control for 10 occupations and 10 industry dummies as additional explanatory variables. These dummy variables represent all the occupation categories and industry codes available in our dataset. Controlling for occupation and industry reduces the estimated wage effects of labour market experience and firm tenure for all four groups. The gap in the returns between the four groups has, however, remained relatively unchanged. The reduction in magnitude of the estimated wage returns for all four groups provides suggestive evidence in support of our hypothesis of occupation

⁴ Skilled: legislators, senior officials and managers, professionals, technical and associate professionals;

Semi-skilled: clerks, service workers and shop and market sales workers, skilled agricultural and fishery workers, craft and related trades workers, plant and machine operators and assemblers; and

Unskilled: elementary occupation and domestic workers.

⁵ In Table 4 we have not interacted education with the experience and tenure variables so the point estimates between Table 2 and column A of Table 4 are marginally different in magnitude.

and industry differences in wage structures influencing the wage-experience and wage-tenure profiles. In columns C and D we turn to the second part of our hypothesis.

From Table 3 above, we learned that black women are primarily absorbed into domestic services and elementary occupations. Similarly, more black women are employed in the public sector. With this in mind, in column C and D we investigate whether the prevalence of black women in domestic services and the public sector is what is driving the results in Table 2 and the first two columns of Table 4.

In Column C we interacted the occupation category for domestic workers individually with the tenure and experience variables. Since domestic workers are predominantly black women and in domestic services there may be a great value placed on trust between employer and employee and this trust may be strengthened the longer the employment relationship continues. The strengthening of this trust may coincide with an increase in the value of the employment relationship for both parties and thus lead to greater returns to firm tenure. This logic however seems not to be supported by the results in column C. Black women working as domestic workers earn much greater returns to labour market experience and much lower returns to firm tenure compared to fellow black workers in other occupations. This is evident from the positive, large and statistically significant point estimate for the interaction variable between domestic and the linear experience variable. Furthermore, the interaction variable between domestic and the linear tenure variable is negative, large and statistically significant.

Table 6: Controlling for occupation and industry

	Black women	Black men	White women	White men
Predicted experience	0.0407 (0.0033)**	0.0384 (0.0032)**	0.0449 (0.0062)**	0.0288 (0.0057)**
Predicted experience ²	-0.0015 (0.0001)**	-0.0013 (0.0001)**	-0.0012 (0.0002)**	-0.0007 (0.0001)**
Tenure	0.0349 (0.0024)**	0.0333 (0.0020)**	0.0207 (0.0051)**	0.0296 (0.0048)**
Tenure ²	-0.0008 (0.0001)**	-0.0007 (0.0001)**	-0.0004 (0.0002)**	-0.0005 (0.0001)**
Constant	1.4818 (0.0934)**	0.9067 (0.0690)**	1.8852 (0.3737)**	1.8732 (0.4260)**
R^2	0.67	0.61	0.35	0.41
N	21,999	26,389	4,596	4,930

Controls: province; rural/urban status; household head; marital status; firm size; union status; wave fixed effects;
occupation and industry

Robust standard errors in parentheses

* $p < 0.05$; ** $p < 0.01$

In column D we follow a similar procedure but with the focus now on the effects of public sector employment on the wage-tenure and wage-experience profiles. Column D paints an interesting picture. There appears to be no wage return to labour market experience after conditioning for the variables we have conditioned for in our earnings regression. Wage growth for public sector employees is solely driven by seniority or returns to firm tenure.

From the evidence presented in Table 4 we can conclude that occupation and industry choice does play a role in accounting for the returns to labour market experience and firm tenure that we estimated in Table 2. Specifically, we have shown that it is not the prevalence of black women in domestic services but rather their prevalence in the public sector that drives their lower returns to labour market experience and greater returns to firm tenure. But occupation and industry choice does not fully account for the full set of results presented in Table 2 since the between-group gap in the wage returns still persists even after controlling for occupation and industry. We therefore proceed to investigate our third hypothesis below.

4.2.3 Uncertainty about the quality of the worker-firm match and expected productivity

According to Jovanovic's (1979) job matching model of labour turnover, the productivity of a given worker in a given job is unknown *ex ante* by neither employer nor employee and this gives rise to uncertainty about the quality of the worker-firm match. The screening process is imperfect since employers receive noisy labour market signals of the expected productivity of potential workers. The uncertainty is resolved through a learning process in which the worker's output is observed by the employer while on the job. Consequently, workers differ in an unobservable way (or at least unobservable to the econometrician) in the degree to which they (or their skills set) are well matched to their current employer and the quality of the worker-firm match is itself correlated to individual wages but also to tenure.

Building on the insights of Jovanovic, a key prediction of the recent job matching models is that a worker whose expected productivity is imprecisely estimated, *ex ante*, will enjoy greater within-firm wage growth (Sicilian, 1995). In our third hypothesis, we contend that there is greater *ex ante* uncertainty concerning the expected productivity of black workers and quality of the worker-firm matches they enter into. Such uncertainty is largely driven by noisier labour market signals and weaker labour market attachment that lead to inferior information networks. We, therefore, argue that when such uncertainty is resolved through employer learning, there should be quicker within-firm wage growth for these workers which produces steeper wage-tenure profiles for black workers relative to their white counterparts.

We follow two strategies to test for this hypothesis. Firstly, we implement Altonji and Shakotko's (1987) instrumental variables estimator for addressing the heterogeneity in the quality of the worker-firm match that induces endogeneity in the OLS earnings regressions. Secondly, we exploit group variation in the average wage gain due to the accumulation of the first year of tenure⁶. The within-firm wage gain in the first year of employment is used to infer the degree of *ex ante* uncertainty around the expected productivity of workers. We expand a bit further on these strategies below and present the results in Tables 5 and 6.

Altonji and Shakotko (1987) suggested instrumenting for the tenure variable (and its higher order term), with “the deviations of the tenure variables around their means for the sample observations on a given job match” as the principal instruments (Altonji and Shakotko, 1987: 439). By construction, “the variation in tenure over the job, in contrast to the variation in tenure across individuals and jobs, is uncorrelated with the fixed individual and job match components of the error term of the wage model” (Altonji and Shakotko, 1987: 438). The instrumental variables strategy of Altonji and Shakotko (1987) allows us to ‘hold’ constant the quality of a given worker-firm match and thus allowing a cleaner estimation of the wage effects of firm tenure. The authors implement this procedure with two-stage least squares (2SLS) estimation and with the use of panel data. We follow this instrumental variables procedure but we however make use of the control function approach for the estimation instead of 2SLS. According to our foregoing hypothesis, after controlling for the unobserved quality of the worker-firm match there should be no significantly greater reward for an additional year of tenure for black workers compared to their white counterparts. Table 5 below summarises the IV results.

There are a number of interesting and key results summarised in Table 5 that contrast with the results presented in Table 2. Firstly, the wage effects of firm tenure for all groups are smaller when estimated using the instrumental variables strategy. This suggests that the pooled OLS results in Table 2 that do not address the unobserved heterogeneity in worker-firm match quality are upwardly biased. This is in line with Altonji and Shakotko's (1987) contention that firm tenure is positively correlated to the worker-firm match quality and thus introduces an upward bias in an OLS estimation of the wage effects of employment tenure.

Controlling for worker-firm match quality reduces the estimated wage effect of tenure by half for black workers – the coefficient for the linear tenure term decreases from 0.0439 to 0.0193 for black women and from 0.0359 to 0.0181 for black men. And the between-group gap in the returns to tenure has drastically been reduced. All groups, with the exception of white women, now appear to enjoy

⁶ This is adapted from Altonji and Shakotko's (1987) suggested specification for the tenure variable.

roughly equal wage returns to tenure. The wage-tenure profile for white women is completely flat. The finding of roughly equal wage returns between the groups is in line with the international literature. Bratsberg and Terrell (1998), for example, report similar findings for black and white men in the United of States.

Table 7: Instrumental Variables (Altonji & Shakotko, 1987) – Control Function Approach

	Black women	Black men	White women	White men
P.Experience	0.0200 (0.0023)***	0.0241 (0.0018)***	0.0365 (0.0046)***	0.0311 (0.0050)***
P.Experience ²	-0.0001 (0.00003)***	-0.0003 (0.00003)***	-0.0006 (0.0001)***	-0.0006 (0.0001)***
Tenure	0.0193 (0.0037)***	0.0181 (0.0028)***	-0.0062 (0.0077)	0.0143 (0.0077)*
Tenure ²	-0.0010 (0.0001)***	-0.0006 (0.0001)***	-0.0005 (0.0002)**	-0.0003 (0.0001)**
Constant	1.1438 (0.0904)***	0.7353 (0.0596)***	1.7325 (0.3949)***	1.7946 (0.3056)***
Observations	29147	37280	5363	5921
R-squared	0.67	0.60	0.32	0.41
IV 1 st stage F-stats	1082.46	1667.86	247.37	241.72

Controls: education (splines); predicted residuals from 1st stage regressions; province; rural/urban status; household head; marital status; firm size; occupation; industry; union status; and wave fixed effects.

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

The larger returns to tenure for black workers documented in Table 2 seem to have been largely driven by unobserved heterogeneity in the quality worker-firm match that induces a spurious correlation between tenure and wages.

Another important result from Table 5 is the equalising of the wage returns to labour market experience and firm tenure for black workers. In Table 2, an additional year with the same employer brought about a wage effect that was roughly twice the wage effect that accrued from an additional year of labour market experience for black women. We now turn to our second piece of evidence that lends further credence to our third hypothesis.

One of the key predictions of the job matching models is that individual within-firm wage growth is quicker for workers who employers are more uncertain about their expected productivity at the time of hiring. Wage growth is quicker because initial wages for these workers converge on their expected productivity as their true productivity is learned by employers (Sicilian, 1995). According to the job matching model, workers whom employers are more certain about their expected productivity (due maybe to better labour market signalling) will receive initial wages that reflect their true productivity and thus removing the mechanism that induces wage growth under this model.

With employer learning occurring early in an employment spell (Lange, 2007), we rely on group variation in the average wage gain due to the accumulation of the first year of tenure as our measure of the *ex ante* uncertainty around the expected productivity of black workers. In our earnings regressions we now add a dummy variable (*'oneyear'*) equal to one if tenure is larger or equal to one, and zero otherwise⁷. This dummy variable ensures that the wage gain due to the accumulation of the first year of tenure is not restricted by the quadratic specification of the tenure variable (Altonji and Shakotko, 1987). The coefficient on *'oneyear'* thus captures the within-firm wage growth due to the accumulation of the first year of tenure while still controlling for the tenure profile. Table 6 below reproduces the results in Table 5 but with *'oneyear'* now as an additional regressor.

Table 8: Testing for Information Asymmetry/Uncertainty

	Black women	Black men	White women	White men
P.Experience	0.0209 (0.0023)***	0.0253 (0.0018)***	0.0368 (0.0047)***	0.0323 (0.0050)***
P.Experience ²	-0.0001 (0.0000)***	-0.0003 (0.0000)***	-0.0006 (0.0001)***	-0.0006 (0.0001)***
Tenure	0.0098 (0.0042)**	0.0106 (0.0031)***	-0.0093 (0.0087)	0.0072 (0.0085)
Tenure ²	-0.0008 (0.0001)***	-0.0005 (0.0001)***	-0.0004 (0.0002)**	-0.0002 (0.0001)
Oneyear	0.0958 (0.0199)***	0.0817 (0.0177)***	0.0376 (0.0511)	0.0783 ⁸ (0.0487)
Constant	1.0639 (0.0917)***	0.6671 (0.0612)***	1.6907 (0.3957)***	1.7202 (0.3076)***
Observations	29147	37280	5363	5921
R-squared	0.67	0.60	0.32	0.41
IV 1 st stage F-stats	724.47	1144.73	163.65	165.72

Controls: education (splines); predicted residuals from 1st stage regressions; province; rural/urban status; household head; marital status; firm size; occupation; industry; union status; and wave fixed effects.

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

The estimated coefficient on the *'oneyear'* dummy variable is statistically and economically significant for black men and women. Holding the tenure profile constant (i.e. the linear and squared tenure terms), individual wages for black women increases by an additional 10% in the first year of employment. The similar figure for black men is 8.5%. We ascribe this additional growth in wages as the effect of uncertainty around the productivity of these workers being resolved as employers learn about their true productivity. Put differently, greater within firm wage growth early in an

⁷ *oneyear* is set equal to 0.5 if tenure is equal to 0.5 since our data is collected bi-annually which means that tenure in our data increases in increments of 0.5.

⁸ Marginally insignificant (p-value = 0.108) according to the standard statistical significance levels.

employment spell is indicative of greater *ex ante* uncertainty around the expected productivity of black workers.

Moreover, a great deal of the wage effect of tenure that remained in Table 5 after controlling for worker-firm match quality seems to occur in the first year of employment and we argue that it should be ascribed to employer learning and uncertainty being resolved. This process, however, appears not to be exclusive to just black workers since the point estimate for the ‘*oneyear*’ dummy variable for white men is large in magnitude and marginally insignificant. But we cannot with any a great confidence reject the hypothesis that this coefficient is statistically different from zero.

In this section we argued that the greater returns to tenure documented in Table 2 for black workers can be accounted for by greater uncertainty concerning the expected productivity of these workers as well as the heterogeneity in the quality of worker-firm matches. The results in Table 5 and 6 provided evidence in support of this view. In the next section we take stock of the evidence provided in our empirical analysis and outline some of the key findings from our analysis.

4.3 Summary of results

The objective of this paper was to analyse the relative contributions to wage growth of labour market experience and firm tenure for black and white South African workers. Table 7 below summarises the estimates obtained from our empirical analysis. Instead of reporting point estimates, Table 7 reports the cumulative individual wage growth due to 5 years of labour market experience and firm tenure.

Table 9: Cumulative individual wage growth due to 5 years of potential experience and tenure

	Black women	Black men	White women	White men
Experience				
Base specification	9%	16%	17%	14%
Adjusting potential experience	30%	19%	30%	19%
Controlling for occupation & industry	18%	12%	25%	18%
Controlling for match quality	22%	14%	30%	18%
Controlling for uncertainty	23%	15%	31%	18%
Tenure				
Base specification	22%	20%	12%	15%
Adjusting potential experience	19%	19%	11%	15%
Controlling for occupation & industry	18%	18%	3%	9%
Controlling for match quality	7%	9%	-1%	11%
Controlling for uncertainty				
– With uncertainty	11%	14%	-1%	8%
– Without uncertainty	-1%	5%	-1%	8%

According to the pooled OLS estimates, black women benefit the least in terms of wage growth from additional years of labour market experience. With all else held constant, average individual wages for black women increase only by 11% after five years of labour market experience. The other three groups enjoy a 16% increase in their average wages after five years of labour market experience. Correcting for the bias in the estimated wage effect of labour market experience induced by the proxy measure of experience (i.e. potential experience) changes the picture drastically. Average wages for both black men and women now increase by roughly 40% after five years of labour market experience. This is significantly larger than the increases for white women and men of 28% and 21%, respectively. We interpret this as evidence reflecting a greater downward bias in the estimated wage effect of labour market experience for black workers when using potential experience as proxy for labour market experience. The bias is greater for these workers due to their weaker labour market attachment which is in turn driven by lower employment opportunities.

Controlling for occupation and industry reduces the estimated wage growth from the base specification for all groups except for white men. But the relatively lower wage returns for black workers appears to be robust to the inclusion of occupation and industry in our earnings equations. The relative rankings in the rate of returns to labour market experience are also robust to controlling for unobserved match quality and uncertainty around the expected productivity of black workers. This suggests that addressing the bias in the wage effect of labour market experience due to having an indirect and derived measure of experience is more important in accounting for group differences in the wage returns to labour market experience.

The base specification found greater wage returns to firm tenure for black workers relative to white workers. Controlling for occupation and industry reduced the estimated wage returns for white workers and had no effect on the wage returns for black workers. The greater returns for black workers appear to be driven by unobserved matched quality and uncertainty around the expected productivity of black workers. Controlling for these effects reduces the estimated wage effects of firm tenure for black workers. This suggests that wage returns to firm tenure play a minor role in the growth of individual wages in South Africa.

5. Conclusions

The paper's key objective was to determine the relative contributions of labour market experience and firm tenure to wage growth for black and white South African workers. From our pooled OLS estimation, we found that black workers enjoy much larger wage growth from an additional year of firm tenure than they do from an additional year of labour market experience. The opposite was true for white workers. We derived and empirically tested three hypotheses that account for and serve as

explanations for these results. Our results provided evidence in favour of greater *ex ante* uncertainty around the expected productivity of black workers and the quality worker-firm matches these workers enter into as the key mechanism behind the relatively larger wage returns firm tenure for black workers. With regards to wage returns to labour market experience, our analyses presented evidence of a bias in the wage effects of labour market experience when using potential experience as a proxy or measure for labour market experience. Because of their lower labour market attachment, black workers face a greater penalty in the wage returns as a result of the wedge between potential and actual experience. Be that as it may, individual wage growth in South Africa seems to be largely driven by labour market wage returns with the wage returns to firm tenure playing a minor role.

6. References

- Abraham, K.G. and Farber, H.S. (1987) Job duration, seniority, and earnings. *American Economic Review*, 77(3): 278-297.
- Allanson, P., Atkins, J.P. and Hinks, T. (2002) No end to the racial wage hierarchy in South Africa? *Review of Development Economics*, 6(3): 442-459.
- Altonji, J.G. and Shakotko, R.A. (1987) Do wages rise with job seniority? *Review of Economic Studies*, 54: 437-459.
- Altonji, J. and Williams, N. (2005). Do wages rise with job seniority? A reassessment. *Industrial and Labor Relations Review*, 58(3): 370-397.
- Becker, G.S. (1962) Investment in human capital: A theoretical analysis. *Journal of Political Economy*, 70(5): 9-49.
- Ben-Porath, Y. (1967) The production of human capital and the life cycle of earnings. *Journal of Political Economy*, 75(4): 352-365.
- Bratsberg, B. and Terrell, D. (1998) Experience, tenure, and wage growth of young black and white men. *The Journal of Human Resources*, 33(3): 658-682.
- Elsby, M.W.L. and Shapiro, M.D. (2011) *Changes in the experience-earnings profile: Robustness*. Online appendix to “Why Does trend growth affect equilibrium employment? A new explanation of an old puzzle,” *American Economic Review* (forthcoming).
- Filer, R.K. (1993) The usefulness of predicted values for prior work experience in analyzing labor market outcomes for women. *The Journal of Human Resources*, 28(3): 519-537.
- Garen, J.E. (1989) Job-match quality as an error component and the wage-tenure profile: A comparison and test of alternative estimators. *Journal of Business & Economic Statistics*, 7(2): 245-252.
- Grun, C. (2004) Direct and indirect gender discrimination in the South African labour market. *International Journal of Manpower*, 25(3): 321-342.
- Harris, M. and Holstrom, B. (1982) A theory of wage dynamics. *Review of Economic Studies*, 49(3): 315-333.

- Jovanovic, B. (1979) Job matching and the theory of turnover. *Journal of Political Economy*, 87(5): 972-990.
- Keswell, M. and Poswell, L. (2004) Returns to education in South Africa: A retrospective sensitivity analysis of the available evidence. *South African Journal of Economics*, 72(4): 834-860.
- Lange, F. (2007) The speed of employer learning. *Journal of Labor Economics*, 25(1): 1-35.
- Lazear, E.P. (1981) Agency, earnings profiles, productivity, and hours restrictions. *American Economic Review*, 71(4): 606-620.
- Leibbrandt, M., Woolard, I., Finn, A., and Argent, J. (2010) Trends in South African income distribution and poverty since the fall of apartheid. *OECD Social, Employment and Migration Working Papers*, 101.
- Light, A. (1998) Estimating returns to schooling: When does the career begin? *Economics of Education Review*, 17(1): 31-45.
- Light, A. and Ureta, M. (1995) Early-career work experience and gender wage differentials. *Journal of Labor Economics*, 13(1): 121-154.
- Mincer, J. (1974) *Schooling, experience, and earnings*. New York: Columbia University Press.
- Murphy, K.M. and Welch, F. (1990) Empirical age-earnings profiles. *Journal of Labor Economics*, 8(2): 202-229.
- Mwabu, G. and Schultz, T.P. (2000) Wage premiums for education and location of South African workers, by gender and race. *Economic Development and Cultural Change*, 48(2): 307-334.
- Nawakitphaitoon, K. (2014) Occupational human capital and wages: The role of skills transferability across occupations. *Journal of Labor Research*, 35:63-87.
- Neal, D. (1995) Industry specific human capital: Evidence from displaced workers. *Journal of Labor Economics*, 13(4): 653-677.
- Parent, D. (2000) Industry specific capital and the wage profile: evidence from the national longitudinal survey of youth and the panel study of income dynamics. *Journal of Labor Economics*, 18(2): 306-323.

- Regan, T.L. and Oaxaca, R.L. (2009) Work experience as a source of specification error in earnings models: implications for gender wage decompositions. *Journal of Population Economics*, 22: 463-499.
- Rospabe, S. (2002) How did labour market racial discrimination evolve after the end of apartheid? *The South African Journal of Economics*, 70(1): 185-217.
- Salop, J. and Salop, S (1976) Self-selection and turnover in the labor market. *Quarterly Journal of Economics*, 90(4): 619-627.
- Sherer, G. (2000) Intergroup economic inequality in South Africa: The post-Apartheid era. *American Economic Review*, 90(2): 317-321.
- Sicilian, P. (1995) Employer search and Worker-firm match quality. *The Quarterly Review of Economics and Finance*, 35: 515-532.
- Statistics South Africa (2006). *The South African Labour Force Panel Survey methodology document*. National Statistics System Division, Pretoria.
- Sullivan, P. (2010) Empirical evidence on occupation and industry specific human capital. *Journal of Labor Economics*, 17: 567-580.
- Topel, R. (1991) Specific capital, mobility, and wages: Wages rise with job seniority. *Journal of Political Economy*, 99(1): 145-176.
- Van der Berg, S. (2014) Inequality, poverty and prospects for redistribution. *Development Southern Africa*, 31(2): 197-218.
- Williams, N. (1991) Seniority, experience, and wages in the UK. *Labour Economics*, 16: 272–283.

Appendix

