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ABSTRACT

This paper investigates the state of teacher pay in the South African labour market by comparing the remuneration received by teachers with that received by their non-teaching counterparts. It makes use of wage data from the Labour Force Surveys spanning 2000 to 2007, and 2010. This enables us to investigate the impact of the Occupation Specific Dispensation introduced in 2008 on the age-wage profile of the teaching profession. Remuneration is compared across educational attainment levels, years of experience and across age groups. A Lemieux Decomposition is used to determine what the distribution of teacher wages would look like if teachers were remunerated according to the same structure as non-teachers. It is found that the teaching profession is relatively unattractive to individuals at the top end of the skills distribution in the South African labour market, the result of which may be lower quality candidates entering the teaching profession.

Keywords: education; wage differentials by occupation, wage level and structure
JEL codes: I2, J31

"Attracting qualified individuals into the teaching profession, retaining those qualified teachers, providing them with the necessary skills and knowledge, and motivating them to work hard and to do the best job they can is arguably *the* key education challenge" (Vegas and Umansky, 2005).

1. THE IMPORTANCE OF TEACHERS IN ACHIEVING QUALITY EDUCATION: A CASE FOR EFFECTIVE INCENTIVES

It is widely believed by both teachers and non-teachers in South Africa that teachers are under-paid. Indeed, it is widely thought that well-performing teachers are under-paid, and so at the upper end of the teacher skills distribution, this sentiment may well be founded. However, considering mean student performance and mean teacher pay in South Africa, it is very easily argued that teachers may in fact be over-paid, given the apparent lack of productivity associated with their work. One of the fundamental problems underlying this apparent lack of productivity is the fact that South Africa's teacher pay system barely differentiates between well- and badly-performing teachers. This largely results from the fact that data on teacher quality is rare, if it exists at all (Van der Berg, Taylor, Spaull, Gustafsson and Armstrong, 2011)

Internationally teachers are generally found to be under-paid relative to those employed in non-teaching professions, given their level of educational attainment and experience in the teaching force. It is often argued that this is the case because of the poor productivity of the profession relative to other professions. In the South African context, one is hard-pressed to argue that teachers should be paid more. Between 2007 and 2009, teachers experienced a 15 percent increase in real terms in average pay, despite the financial crisis. In fact, even before this substantial increase, teacher pay in South Africa was exceptionally high relative to per capita GDP. The question therefore becomes how teacher pay should be adjusted in order to attain higher performance within South African schools. What is required is a pay system designed to incentivise good teaching as well as linking salary increments to experience in a way that disincentivises good teachers from leaving the profession. Indeed, top-performing teachers are often attracted out of the teaching profession and into private sector jobs with far more attractive wages (Van der Berg et. al., 2011).

The importance of teachers in the South African education system should not be underestimated. In terms of the distribution of public resources, the proportion spent on teachers is immense. Gustafsson and Patel (2008) point out that approximately 3.0 percent of economically active South Africans are educators (although this is limited to teachers who are publicly employed; this proportion increases to 4.5 percent if all individuals classifying themselves as educators are counted), and the educator wage bill is roughly 3.5 percent of GDP. In 2009, some 17.9 percent of government spending was spent on education, and 81.5 percent of that education spending was spent on teacher salaries (UNESCO, 2011) – a clear indication that an immense proportion of public spending on education is personnel spending. It is therefore important to investigate and understand the performance of teachers as they constitute a considerable expenditure item in the government's budget.

Low teacher effort and low levels of teacher skills present a sizeable challenge in the South African education system. Many argue that low teacher effort is a greater challenge to educational performance than low level of teacher skills, suggesting that policy response in terms of teachers should be focused more on designing attractive incentives rather than on in-service training "solutions". Indeed, high levels of absence from classrooms, poor lesson preparation and very low levels of interest in the progress of learners are key signs that teacher effort is critically low in South Africa. It is often reported that such low levels of effort result from weak incentive systems. Furthermore, the structure of the teacher workforce, in particular the exceptionally strong influence that teacher unions have in the structuring of this workforce, make it close to impossible to even discuss changes to the status quo (Van der Berg et. al., 2011).

In terms of teacher incentives, three key areas of empirical enquiry present themselves, namely the time that teachers actually spend teaching, whether or not teacher pay is considered adequate (as well as the structure of teacher salary scales), and the number of new teachers that are taken in annually (Van der Berg et. al., 2011). This paper is an attempt to clarify the situation with regards to the adequacy of teacher pay. It takes a look at the earnings of teachers in comparison to those of their non-teaching counterparts in the South African labour force, investigating whether the profession is considered attractive from a labour market perspective.

The paper tackles the question of the adequacy of teacher pay and the attractiveness of the profession as follows: Section 2 provides a brief overview of the situation in South Africa

regarding the demand and supply of teachers, serving largely to provide the context in which teacher wages are analysed. Section 3 presents the analysis of teacher wages in which the remuneration structures of teachers and non-teachers are compared. Section 4 provides a brief analysis of the academic performance of students enrolled for education degrees in comparison to those enrolled in other areas of study as a possible explanation for the differences observed in the remuneration of the two groups. Section 5 concludes.

2. WAGE ANALYSIS[1]

Hernani-Limarino (2005) points out that arguably the most important determinant of the recruitment, performance and retention of effective teachers is whether or not they are well-paid. He points out, however, that although wages are the central point of the employment contract, there are important aspects of employment aside from wages that determine the attractiveness of a job. It is argued that the recruitment, performance and retention of teachers is directly related to the opportunity cost of being a teacher and that in most cases, the opportunity cost of being a teacher is restricted to the wage that an individual entering the teaching profession might have received in a profession other than teaching. However, this idea of the opportunity cost of teaching ignores some very important factors that may impact on how individuals perform their role as teacher,s the incentives that teachers face to perform well and, importantly, the probability that well-performing teachers (and high-ability individuals) will remain in the teaching profession.

Some of the characteristics of employment that affect its attractiveness include the hours individuals are expected to work in a particular job, the stability of the job, and the flexibility of schedules and non-monetary benefits (such as in-kind payments and holidays) that may not be easily captured by survey data collection (Hernani-Limarino, 2005). However, as we broaden the definition of the opportunity cost of being a teacher, so too do we increase the information requirement regarding the non-wage aspects of the labour contract, and although this information is useful and contributes to our understanding of the attractiveness of the teaching profession, it complicates the analysis somewhat. The difficulties involved with the assignment of values to non-monetary benefits and other employment characteristics may lead to inaccuracies in the calculation of teaching's opportunity cost.

[1]The fact that earnings data in the Labour Force Survey (to be used in this paper) is self-reported introduces potential for bias. In order to measure the potential bias in the self-reported earnings data, a brief analysis of the possibility of underreporting of wages by teachers using Persal payroll data is is presented in the appendix. It is impossible to ascertain whether under-reporting differs across different groups of workers, however.

For that reason, the analysis conducted in this section focuses primarily on the wage aspect of teaching in comparison to other professions.

This section makes use of data from the March and September rounds of the Labour Force Surveys (LFS) from 2000 to 2007, as well as the Quarterly Labour Force Survey (QLFS) of 2010. Earnings data was not collected for the 2008 and 2009 versions of the QLFS, hence the 2 year gap between the surveys which are used in this analysis. Furthermore, earnings data were only collected in one quarter of the QLFS, so the sample for 2010 is significantly smaller than what is available for the 2000 to 2007 LFSs. The analysis is conducted only for employed workers in the South African labour market. Workers reporting real monthly earnings in excess of R200 000, workers employed in the informal sector, agricultural sector, domestic workers and the self-employed are excluded from the analysis.

Real hourly wages are used throughout the analysis. It is important to note that earnings captured in 2010 are implausibly high, even when deflated to 2000 prices. This is apparent in the constant term observed in table 4 below.

Table 2 below presents the number of teachers and non-teachers in the data, by year.

TABLE 2: Number of Teachers and Non-Teachers

Year	Teachers	Non-Teachers	Percentage of Sample that are Teachers	Total
2000	606 791	14 375 968	4.05	14 982 759
2001	612 438	14 618 009	4.02	15 230 447
2002	639 828	14 537 369	4.22	15 177 197
2003	853 307	14 505 334	5.56	15 358 641
2004	846 808	14 745 809	5.43	15 592 617
2005	880 953	15 498 690	5.38	16 379 643
2006	853 247	16 271 182	4.98	17 124 429
2007	946 320	16 961 273	5.28	17 907 593
2010	403 554	7 932 889	4.84	8 336 443

Source: LFS 2000 - 2007

The variables included in the Mincerian wage function are presented in the appendix, along with a table containing their summary statistics.

The summary statistics indicate that teachers have acquired higher levels of education than their counterparts in non-teaching professions. The values of experience (and therefore experience squared) are almost identical for the 2 groups and some 76 percent of teacher are

union members compared to just 27 percent of non-teachers. The teaching force is considerably more female than non-teaching professions, with 64 percent of teachers being female versus just 41 percent of non-teaching professions. Teachers have on average also remained with the same employer for longer than have non-teachers, with teachers having an average tenure of 11.68 years in comparison to 7.10 years for non-teachers. In terms of the racial composition of the two groups for which data is presented, the black and Indian component is almost identical for both teachers and non-teachers, with non-teachers having a higher coloured component than teachers (11 percent of non-teachers are coloured compared to 6 percent of teachers), and teachers having a higher white component than non-teachers (24 percent of teachers are white versus just 16 percent of non-teachers).

The analysis in this paper is conducted for workers with at least 12 years of education. It compares teachers to all non-teachers in the labour market, as well as to non-teaching professionals. Non-teaching professionals as defined in the LFS and QLFS are presented in table A3 in the appendix.

3.1 Wage Differentials

In order to determine whether or not teachers are well-paid, one possibility is to investigate the wages that teachers receive relative to the wages that they might have received in non-teaching professions. The gross (unadjusted) wage differential is a very basic measure of this relationship and reflects differences in wages that result from differences in both the remuneration structures faced by teachers and non-teachers, as well as differences in the productive endowments of members of both groups (Hernani-Limarino, 2005). The gross wage differential is calculated as

$$G_{TN} = \left(\frac{\bar{W}_T}{\bar{W}_N}\right) - 1$$

where $\bar{W}_T$ is the mean hourly wage of teacher and $\bar{W}_N$ is the mean hourly wage of non-teachers. Equation one is approximately equal to the mean log wage differential:

$$G_{TN} \approx \ln(G_{TN} + 1) = \ln(\bar{W}_T) - \ln(\bar{W}_N)$$

In order for the gross wage differential to provide any substantial meaning, the group to whom teachers are compared should share similar productive characteristics.

Under the assumption of competitive labour markets, wages are understood to reflect the marginal product of labour. Wages are therefore a function of the worker's productive characteristics and the returns that those characteristics fetch in the labour market. If we let $\bar{W}_{TO}$ and $\bar{W}_{NO}$ reflect the mean wages received by teachers and non-teachers, respectively, if they both face the same return structure for their productive characteristics, then the mean ***productivity wage differential*** is given by

$$Q_{TN} = \left(\frac{\bar{W}_{TO}}{\bar{W}_{NO}}\right) - 1$$

Therefore, the part of the wage differential that can be attributed to differences in the structure of returns faced by teachers and non-teachers – the ***conditional mean wage differential*** – will be calculated by the difference between the gross mean wage differential and the productivity wage differential:

$$D_{TN} = \left[\left(\frac{\bar{W}_{T}}{\bar{W}_{N}}\right) - \left(\frac{\bar{W}_{TO}}{\bar{W}_{NO}}\right)\right] / \left(\frac{\bar{W}_{TO}}{\bar{W}_{NO}}\right)$$

It is therefore possible to decompose the gross wage differential into

$$\ln(G_{TN} + 1) = \ln(Q_{TN} + 1) + \ln(D_{TN} + 1)$$

In other words, it is possible to decompose the gross wage differential into a part that is explained by differences in productive characteristics and a part that is explained by differences in the way that productive characteristics are remunerated for teachers and non-teachers.

Table 3 presents wage differentials for teachers and non-teachers and for teachers and non-teaching professionals, respectively.

TABLE 3: Wage differentials between teachers, non-teachers and non-teaching professionals (2000 – 2007 and 2010)

	Gross gap (1)		**Productivity gap (2)**		**Conditional gap (3)**	
	2000-2007	**2010**	**2000-2007**	**2010**	**2000-2007**	**2010**
Teachers and non-teachers	1.41	0.97	0.59	0.54	0.52	0.28
Teachers and non-teaching professionals	-0.30	-0.13	-0.02	0.08	-0.28	-0.19

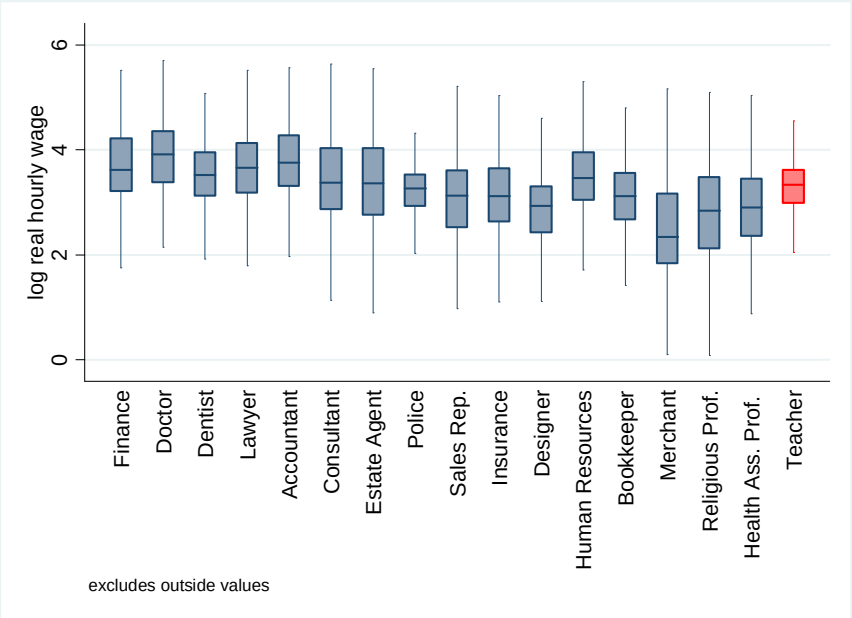
Source: Own calculations from LFS (March and September) 2000 – 2007 and QLFS (2020), Stats SA

From table 5, we see that wage differentials favour teachers when compared to all non-teachers in the South African labour market. However, when teachers are compared to non-teaching professionals, teachers perform worse for all measures of wage differentials. As explained earlier, the conditional gap represents the portion of the overall wage differential that is attributable to differences in the remuneration structures faced by teachers and non-teachers. The negative conditional gap in favour of non-teaching professionals suggests that these professionals face a more attractive remuneration structure in the sense that the remuneration they receive for their productive characteristics are higher than those received by teachers.

Comparing teachers to all other non-teachers, we observe a positive wage gap that favours teachers, which is associated with the higher levels of human capital endowment amongst teachers relative to this larger sample (of non-teachers, rather than non-teaching professionals). The negative productivity gap relative to non-teaching professionals for the 2000 to 2007 sample is associated with the observation that non-teaching professionals are in fact better endowed in terms of human capital than their teaching counterparts. This appears to reverse in favour of teachers in 2010.

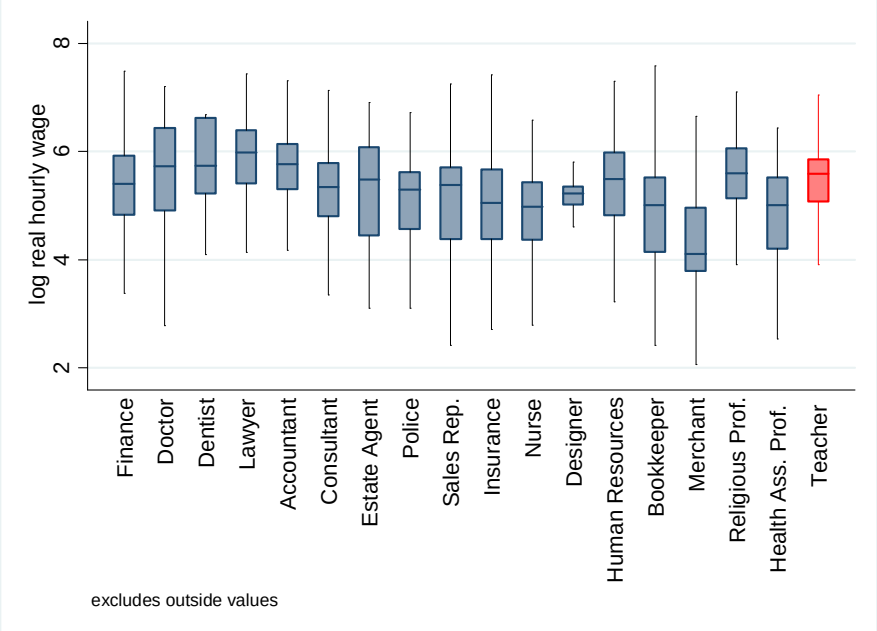
While examining wage differentials is useful to understand what is happening at the mean, it may be useful to investigate how the distribution of teacher wages compares to that of non-teachers in the labour market. Following Gustafsson and Patel (2009), boxplots for real hourly wages have been plotted for teachers and some non-teaching professionals, allowing for an (admittedly superficial) investigation into how teachers' earnings compare with those of others in the labour market. Figures 2 and 3 present the boxplots for the 2000 to 2007 period and for 2010, respectively.

FIGURE 2: Boxplots of log real hourly wage (2000 – 2007)



Source: Own calculations from LFS (March and September) 2000 – 2007, Stats SA

FIGURE 3: Boxplots of log real hourly wage (2010)



Source: Own calculations from QLFS 2010, Stats SA

Interesting to observe is that in the 2000 to 2007 data, the range of real hourly wages for teachers is largely comparable to what may be thought of as "lower order" professions. In comparison to professions that are considered "prestigious" in the South African context (and largely internationally, too), teachers' hourly wage rate is slightly lower. We also see that the range of wages for teachers is narrower than it is for most other professions, highlighting the absence of large wage returns in the teaching profession. Again with the exception of individuals employed in the police force and potentially designers, teachers being paid the greatest wage on an hourly basis (excluding outliers) still receive hourly wages below that of all other professions included in the figure.

The picture is similar for 2010. with the range of teacher wages appearing to be smaller than for most other professions included in the analysis. The position of teachers relative to non-teaching professionals in the labour market remains more or less unchanged.

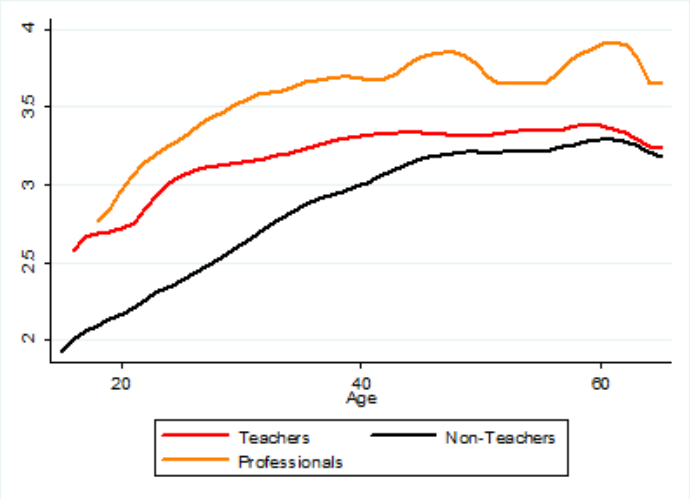
This raises the question of who *should* teachers be compared to in analysing whether or not teachers receive adequate pay? How would teachers classify themselves in terms of where they sit on the spectrum of professionals, and is this reflected in the remuneration structure they experience?

In order to compare the remuneration structure of teachers with that experienced by non-teaching professionals in the South African labour market, the analysis is extended to investigate the returns to labour market characteristics. This is done in the following subsections.

3.2 Local Polynomial Smoothed Lines

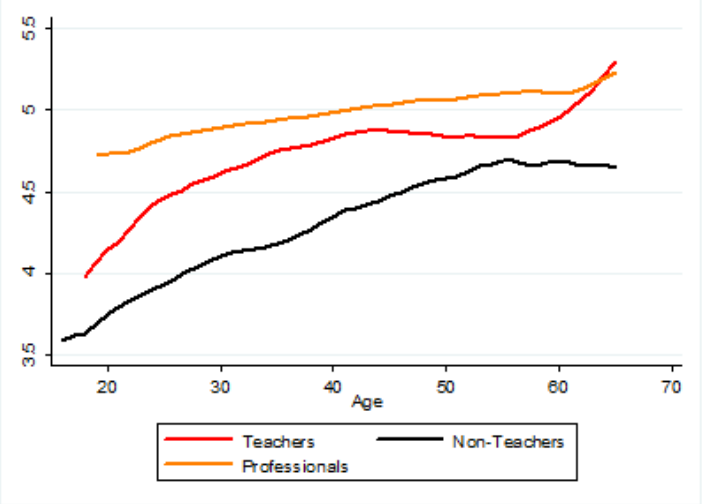
The local polynomial smoothed line is a line fitted to the data using weighted least squares. More weight is given to the points nearest to the point for which the response is being estimated, with points further away from that point receiving less weight. Such a local polynomial therefore enables us to observe the relationship between experience and wages without imposing any functional form on it, so we can see whether or not the remuneration structure of teachers is fundamentally different to that of non-teachers and non-teaching professionals. Figures 9 and 10 present the local polynomial smoothed lines for the relationship between wages and age – the age-wage profile – for the pooled 2000 to 2007 dataset and for the 2010 data, respectively.

FIGURE 9: Local Polynomial Smoothed Lines for Age-Wage Profile (2000 – 2007)



Source: Own calculations from LFS (March and September) 2000 – 2007, Stats SA.

FIGURE 10: Local Polynomial Smoothed Lines for Age-Wage Profile (2010)



Source: Own calculations from QLFS (March and September) 2000 – 2007, Stats SA.

The age-wage profile for teachers in the 2000 to 2007 data indicate that after age 40, returns to age appear to flatten out. This appears to be the case for all groups of workers in the economy and not exclusively for teachers. However, even when the returns to age are increasing for teachers, the slope of the profile in figure 9 indicates that it is increasing at a slower rate than is the case for non-teachers and non-teaching professionals. Figure 10 show quite a different story for teachers in 2010. The slope of the age-wage profiles is steeper for

teachers over most of the age range, flattening over the rage of roughly 42 to 55 years of age, and then increasing rapidly again thereafter. It therefore appears that in terms of returns to experience, the situation for teachers has improved somewhat in terms of the relationship between age and earnings.

Local polynomial smoothed lines are useful to look at the shape of the age-wage profile across different groups of workers. However, they are purely descriptive and do not control for differences in characteristics across different groups of workers. Multivariate analysis is required in order to isolate the effect of different productive characteristics on wages. This is conducted using Mincerian earnings functions in section 3.3.

3.3 Mincerian Wage Functions

The Mincerian wage function investigates the return to productive characteristics in the labour market (namely educational attainment and potential labour market experience) and takes the form

$$\begin{aligned}\log of\ hourly\ wage \\ &= \beta_1(13\ years\ of\ Education) + \beta_2(15\ years\ of\ Education) \\ &+ \beta_3(16\ years\ of\ education) + \beta_4(17\ years\ of\ Education) \\ &+ \beta_5(\ teacher\ x\ 13\ years\ of\ education) \\ &+ \beta_6(teacher\ x\ 15\ years\ of\ education) \\ &+ \beta_7(teacher\ x\ 16\ years\ of\ education) \\ &+ \beta_8(teacher\ x\ 17\ years\ of\ education) \\ &+ \beta_9(years\ of\ potential\ experience) \\ &+ \beta_{10}(year\ of\ potential\ experience^2) \\ &+ \beta_{11}(teacher\ x\ years\ of\ potential\ experience) \\ &+ \beta_{12}(teacher\ x\ years\ of\ potential\ experience^2) + \delta X + e\end{aligned}$$

in which β_1 to β_{12} indicate the impact that education, experience and its squared term have on hourly wages as well as whether this differs between teachers and non-teachers in the South African labour market. X is a vector of worker characteristics[2], and δ is a vector of the impact that these characteristics have on the log of hourly wages.

[2] These characteristics include race, sex, marital status, the industry in which workers are employed and the province in which they are employed

Table 4 presents the coefficient obtained for regressions run for pooled data for all the years between 2000 and 2007 (column 1), and for 2000, 2007, and 2010 (columns 2, 3 and 4 respectively).

TABLE 4: Regression estimates for augmented Mincerian wage function on log hourly wages (2000 – 2007 and 2010[3])

VARIABLE	2000 – 2007 (1)	2000 (2)	2007 (3)	2010 (4)
13 yrs education	0.530***	0.478**	0.631***	0.335***
	(0.006)	(0.023)	(0.016)	(0.007)
15 yrs education	0.907***	0.803***	1.080***	0.472***
	(0.009)	(0.031)	(0.025)	(0.011)
16 yrs education	1.053***	1.059***	1.390***	0.568***
	(0.012)	(0.043)	(0.030)	(0.018)
17 yrs education	1.227***		1.383***	0.582***
	(0.027)	-	(0.050)	(0.020)
13 yrs education x teacher	-0.139***	-0.145	-0.104	-0.137***
	(0.032)	(0.119)	(0.079)	(0.035)
15 yrs education x teacher	-0.417***	-0.328**	-0.357***	-0.242***
	(0.035)	(0.128)	(0.089)	(0.039)
16 yrs education x teacher	-0.562***	-0.817***	-0.651***	-0.288***
	(0.037)	(0.136)	(0.091)	(0.048)
17 yrs education x teacher	-1.183***		-0.680***	-0.532***
	(0.089)	-	(0.192)	(0.070)
experience	0.045***	0.048***	0.033***	0.011***
	(0.001)	(0.003)	(0.003)	(0.001)
experience squared	-0.001***	-0.001***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
experience x teacher	0.005	-0.005	0.013	0.014***
	(0.004)	(0.013)	(0.010)	(0.005)
experience squared x teacher	0.000***	0.000	0.000**	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
female	-0.164***	-0.197***	-0.150***	-0.109***
	(0.005)	(0.018)	(0.013)	(0.006)
married	0.153***	0.153***	0.155***	0.076***
	(0.005)	(0.020)	(0.014)	(0.006)
teacher	0.338***	0.425**	0.108	0.074
	(0.047)	(0.165)	(0.096)	(0.054)
constant	1.174***	1.229***	1.403***	2.782***
	(0.020)	(0.069)	(0.053)	(0.100)
Adjusted R-Squared	0.440	0.402	0.510	0.344
No. of Observations	105 897	8 340	15 033	28 860

Source: Own calculations from LFS (March and September) 2000 – 2007 and QLFS 2010, Stats SA. Race, province, year and industry are controlled for in these regressions.

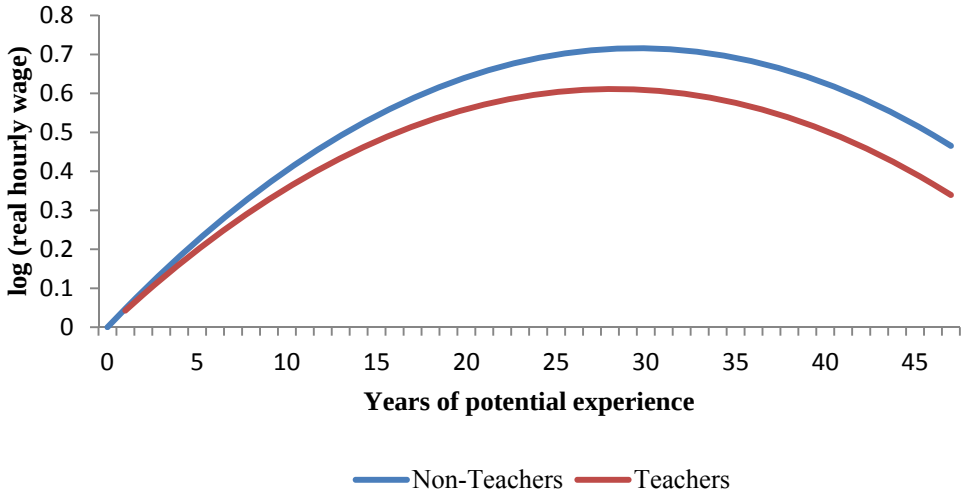
The results in table 4 present important information in terms of the productive characteristics of teachers and how they are remunerated in the labour market. The regressions are run for

[3] The earnings data and union membership status were not included in the same questionnaire for the Quarterly Labour Force Survey of 2010. Union membership is therefore not controlled for.

workers with more than 12 years of education and education dummies are included for workers with 13, 15, 16 and 17 years of education. The education dummies are then interacted with a dummy variable taking a value of 1 for teachers and 0 otherwise, in order to indicate whether returns to education differ significantly for teachers in comparison to non-teacher workers. The same is done for experience and its squared term in order to investigate whether the returns to labour market experience differ for teachers and non-teachers. In terms of labour market returns to education, table 6 indicates that teachers are initially better remunerated than the non-teachers investigated here at relatively low levels of education and experience, but that these gaps decrease with higher levels of education, as reflected in the negative and coefficients for interaction effects that grows in size with more education. This highlights the fact that in terms of returns to educational attainment, the teaching profession is least attractive to individuals with higher levels of education. The size of the negative teacher effect remains fairly stable across time.

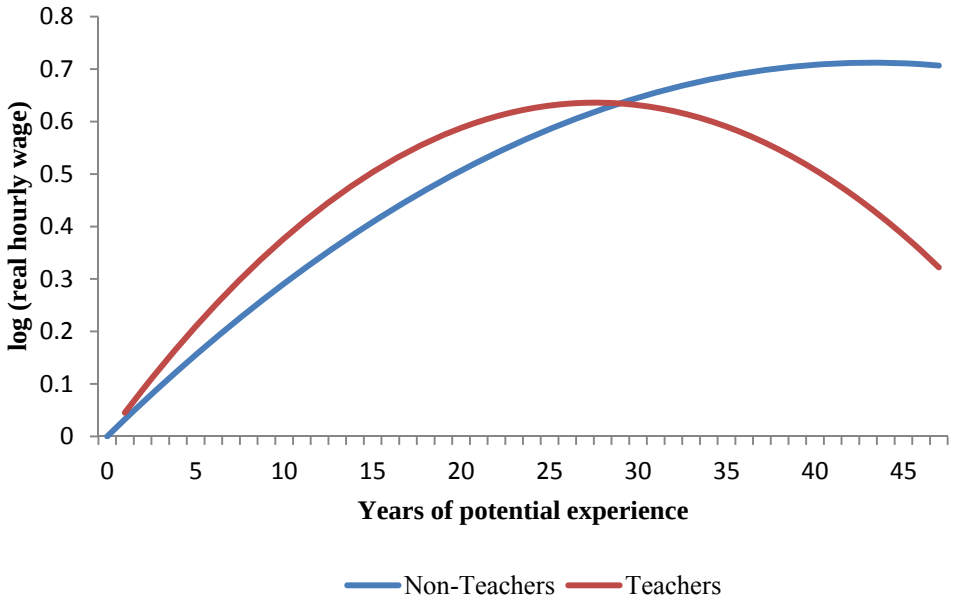
In terms of the returns to experience for teachers versus non-teachers, the quadratic term introduced to account for possible non-linearities makes it difficult to interpret the effect of experience on earnings by simply analysing the coefficients. The returns to experience have therefore been graphed for equations 2, 3 and 4 in figures 4, 5 and 6 respectively.

FIGURE 4: Returns to Potential Experience (2000)



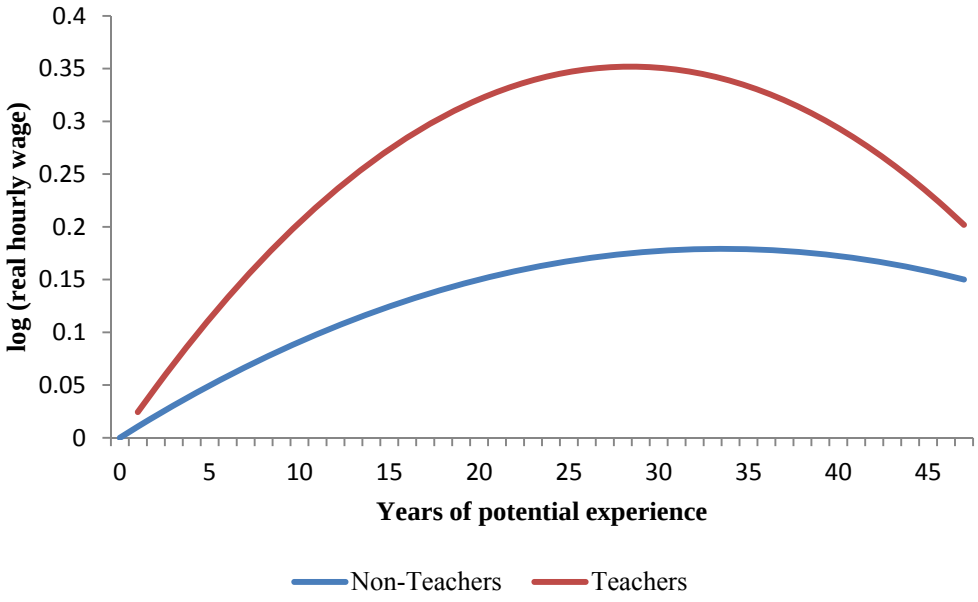
Source: Own calculations from LFS (March and September) 2000 – 2007 Stats SA.

FIGURE 5: Returns to Potential Experience (2007)



Source: Own calculations from LFS (March and September) 2000 – 2007, Stats SA.

FIGURE 6: Returns to Potential Experience (2010)



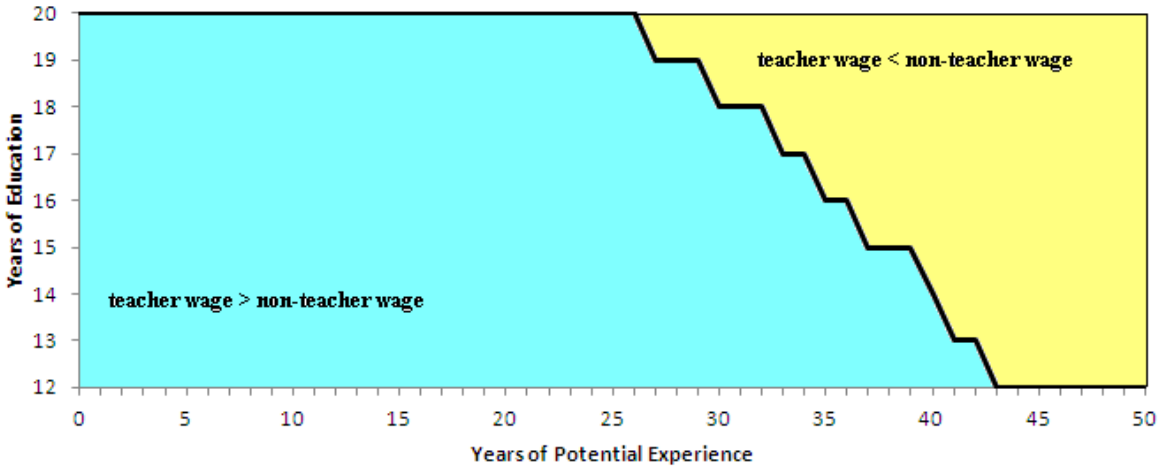
Source: Own calculations from QLFS 2010, Stats SA.

The figures illustrate the relative flatness of the experience profiles for members of the teaching profession in comparison to those of non-teachers. In 2000 the returns to experience for teachers are below those of non-teachers at all levels of experience, and the teacher disadvantage appears to grow at higher levels of experience. In 2007, the returns to experience amongst teachers are higher than amongst their non-teaching counterparts until roughly 28 years of labour market experience, after which they decrease rapidly. Interestingly, in 2010 it appears that the difference between teachers and non-teachers in terms of returns to experience is in favour of teachers at all levels of experience. However, after 25 years of experience returns for teachers start to decrease, therefore narrowing the gap between the groups. A steeper gradient on the profile indicates that teacher pay increases at a faster rate as teachers gain more experience, but also that the returns to experience amongst teachers fall considerably faster than those of non-teachers at higher levels of education. Yet, returns to experience for teachers are across all levels of experience are higher than they are for non-teachers. This suggest that despite evidence of little incentive in earlier years (i.e. 2000 to 2007) for teachers to remain in the teaching profession after a certain level of experience has been attained, it appears that returns to experience for teachers may have improved over the period 2008 to 2010.

An attempt to compare the attractiveness of wages for teachers and non-teachers across the range of educational attainment and potential experience is presented with a "profile" of teacher and non-teacher earnings drawn for different combinations of education and experience[4]. Following Mizala and Romaguera (2004),this profile is drawn for the entire labour force, regardless of their level of educational attainment, as well as for individuals with at least 10 years of education. The objective is to analyse the level of education and experience at which teacher wages become more or less attractive, at the mean. The area shaded blue indicates the levels of education and experience at which teacher wages exceed those of non-teachers, while the area shaded yellow represents the levels of education and experience at which non-teacher wages exceed those of teachers. The profiles are presented in figures 7 and 8.

[4] The coefficients of the Mincerian wage function for which these profiles are drawn is presented in the appendix.

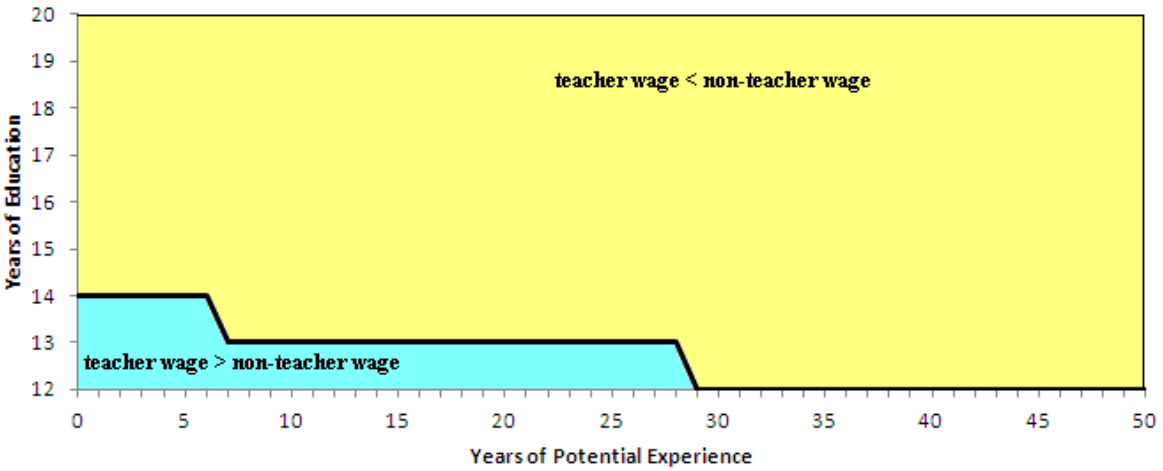
FIGURE 7: Wage differential between teachers and non-teachers (2000 – 2007)



Source: Own calculations from LFS (March and September) 2000 – 2007, Stats SA.

From figure 7, it may be seen that up until 25 years of labour market experience, for all levels of educational attainment, teacher wages are higher than those of non-teachers in the South African labour market. After 25 years of labour market experience, the wage of non-teachers becomes incrementally more attractive at higher levels of labour market experience. This provides evidence of the unattractiveness of the age-wage profile in terms of returns to experience for the teaching profession while also highlighting the attractiveness of the profession for younger labour market participants.

FIGURE 8: Wage differential between teachers and non-teachers with at least 10 years of education (2000 – 2007)



Source: Own calculations from LFS (March and September) 2000 – 2007, Stats SA.

Figure 8 presents the profile for non-teachers with a minimum of 10 years of educational attainment, therefore comparing teachers to a more educated sample of workers in the South African labour market. It is clear that for individuals with more than 14 years of education, the teaching profession is never more attractive than non-educator professions (in terms of returns to productive characteristics), regardless of the level of labour market experience. For individuals with 14 years of education, the teaching profession is more attractive than non-teaching professions only for the first 6 years in the labour market, while for workers with 13 years of education the teaching profession remains more attractive until 28 years of labour market experience.

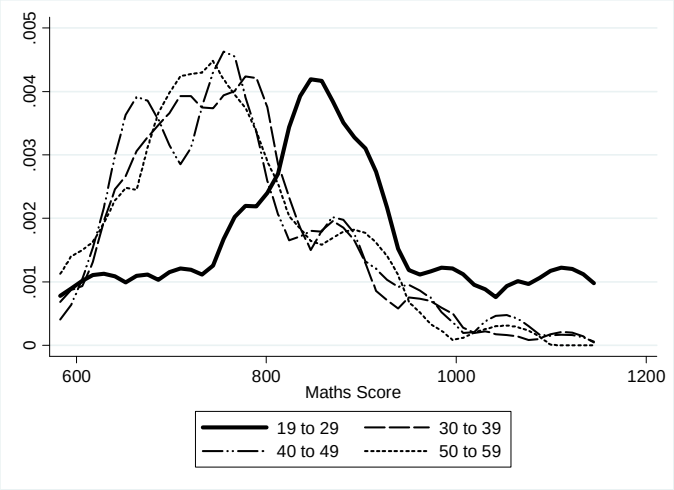
Figures 7 and 8 illustrate the relative unattractiveness of the teaching profession for workers with higher levels of education. We can see that in figure 8, drawn for a more educated sample of non-teachers, the teaching profession is almost always less attractive than non-teaching professions, while in figure 7 it is only at higher levels of labour market experience that the teaching profession becomes less attractive.

So what drives the lack of relationship between age and earnings for teachers in the 2000 to 2007 data? A possible explanation for the diminishing returns to experience is that teachers in these age groups are simply not as productive as younger teachers (for whom returns to experience seem to be in line with the rest of the labour force).

This hypothesis is tested using data from the third cross-country study conducted by the Southern African Consortium for the Measurement of Educational Quality (SACMEQIII) which took place in 2007 – the only study in which South African teachers wrote the teacher test. We make use of the score obtained by different age groups of South African mathematics teachers on the mathematics test in order to ascertain whether there is a difference in performance between older and younger teachers.

The data are presented in figure 11.

FIGURE 11: Teacher Mathematics Score by Age Group (2007)

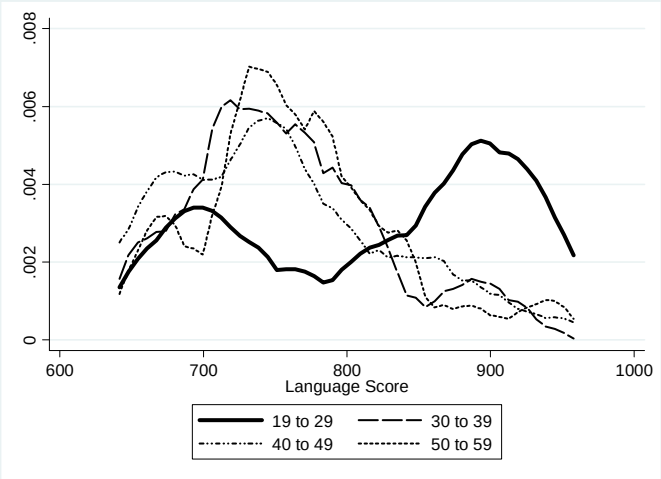


Source: SACMEQIII, 2007

Figure 11 reveals that for maths, those falling into the youngest age group (between the ages of 19 and 29) performed considerably better than teachers in older age groups.[5] Interestingly, it appears as if there are not great differences in performance amongst the different older age categories shown here.

A similar result is observed for performance on the language test amongst reading teachers. The results are presented in figure 12.

FIGURE 12: Teacher Language Score by Age Group (2007)



Source: SACMEQIII, 2007

[5] A t-test confirms that the difference in performance in both maths and language between teachers younger than 29 and those older than 29 is significant (|t| = 13.709 for maths and |t| = 13.638 for language).

The SACMEQIII teacher tests therefore appear to suggest that younger teachers perform better than older teachers in the subject which they teach. The data is admittedly descriptive and further analysis is required to fully unpack this difference. However, the fact that younger teachers perform better than younger teachers is positive, given the fact that the South African teaching force is on average older than those of other countries with the result that a large proportion of teachers are likely to retired and be replaced with younger and according to this analysis, better teachers.

The analysis so far has highlighted the fact that teachers' productive characteristics are not rewarded attractively relative to those of non-teachers in the labour market. What if teachers' productive characteristics were remunerated in the same way as those of non-teachers? Would the distribution of teacher wages be higher or lower than that of their non-teaching counterparts? This is investigated using a Lemieux decomposition.

3.4 Lemieux Decomposition

This decomposition technique is used to create a counterfactual wage distribution for teachers and non-teachers in the South African labour force. The Lemieux decomposition used in this paper may be understood to be a generalization of the decomposition technique first introduced by Oaxaca and Blinder in 1973 (Lemieux, 2002). The Oaxaca-Blinder decomposition decomposes the difference in the mean wage between two groups into the component explained by differences in productive characteristics and into an "unexplained" component (i.e. a component resulting from differences in how productive characteristics are remunerated between the two groups in question, or "discrimination").

Decomposing the wage gap at the mean involves estimating the Ordinary Least Squares (OLS) wage regression

$$y_{it} = b_t x_{it} + u_{it} \quad \textbf{(8)}$$

where y_{it} is the log hourly wage of individual i belonging to group t (in this case to the group *teachers*), x_{it} is a vector of covariates, b_t is a vector of parameters and u_{it} is an error term constructed to have a mean of 0 and to be uncorrelated with the covariates in the vector x_{it} (Lemieux, 2002). The sample average outcome y for teachers is therefore

$$\bar{y}_t = \bar{x}_t b_t \quad \textbf{(9)}$$

where $\bar{y}_t = \sum_1 \omega_{it}\ y_{it}$

and $\bar{x}_t = \sum_1 \omega_{it}\ x_{it}$.

The outcome for individuals belonging to the second group in the sample (in this case *non-teachers*) is estimated by

$$y_{in} = b_t x_{in} + u_{in} \quad \textbf{(10)}$$

where y_{in} is the log hourly wage of individual i belonging to group n (i.e. non-teachers), x_{is} is a vector of covariates, b_s is vector of parameters and u_{is} is an error term constructed to have a mean of 0 and to be uncorrelated with the covariates in the vector x_{is}. The sample average outcome y for teachers is therefore

$$\bar{y}_n = \bar{x}_n b_n \quad \textbf{(11)}$$

where $\bar{y}_n = \sum_1 \omega_{in}\ y_{in}$

and $\bar{x}_t = \sum_1 \omega_{in}\ x_{in}$.

Calculating the difference between the mean outcomes of teachers and non-teachers therefore yields

$$\bar{y}_t - \bar{y}_n = \bar{x}_t\ (b_t - b_n) + b_n(\bar{x}_t - \bar{x}_n) \quad \textbf{(12)}$$

where $\bar{x}_t\ (b_t - b_n)$ is the difference in wages arising from differences in the remuneration structures faced by teachers and non-teachers (i.e. the "unexplained" component) and $b_n(\bar{x}_t - \bar{x}_n)$ is the difference in wages arising from differences in productive characteristics between teachers and non-teachers (Lemieux, 2002). $b_n\bar{x}_t$ may therefore be seen as the counterfactual mean value of *y* that would result if the remuneration structure of teachers was replaced with that of non-teachers. In other words, $b_n\bar{x}_t$ would be the wage prevalent for teachers if the "price" of human capital amongst teachers was equal to that experienced by non-teachers in the labour market.

The counterfactual wage for teachers is therefore

$$\bar{y}_t^a = \bar{x}_t b_n \quad \textbf{(13)}$$

which may be used to rewrite equation 12 as

$$\bar{y}_t - \bar{y}_n = (\bar{x}_t b_t - \bar{y}_t^a) + (\bar{y}_t^a - \bar{x}_n b_n) = (\bar{y}_t - \bar{y}_t^a) + (\bar{y}_t^a + \bar{y}_t).$$

Individual counterfactual wages are therefore denoted y_{it}^a and are calculated as

$$y_{it}^a = x_{it}\, b_n + u_{it} = y_{it} + x_{it}(b_s - b_t).$$

$\bar{y}_t^a$ may also be calculated by computing a sample mean of y_{it}^a:

$$\bar{y}_t^a = \sum_1 \omega_{it}\, y_{it.}^a \qquad \textbf{(15)}$$

In order to estimate what the entire distribution of teacher wages would look like (as opposed to just the mean wage), the probit for the probability of being a teacher is estimated on the pooled sample of teachers and non-teachers. The probit model produces the probability of being a member of the teaching force conditional on individual worker characteristics, or individual x's.

$$P_{it} = Prob(teacher = 1 \mid x_{it}).$$

The reweighting function is then calculated using the estimated probability of being a teacher as

$$\Psi_i = \frac{[\frac{1-P_{it}}{P_{it}}]}{[\frac{P_t}{(1-P_t)}]}$$

where P_t is the unconditional probability of an observed worker being a member of the teaching force, or the weighted share of the pooled sample who are teachers (Lemieux, 2002). The reweighted distribution or the counterfactual distribution is therefore

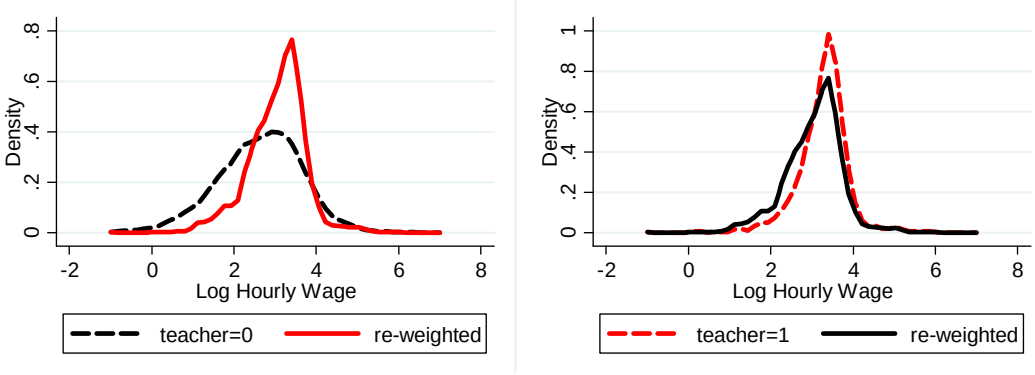
$$y_t^a = \Psi(x_t b_n) = \Psi' y_n \qquad \textbf{(16)}$$

where $\Psi' = \frac{1}{\Psi}$ (Lemieux, 2002).

This technique therefore compares the labour market prospects of teachers to those of non-teachers in the South African labour market.

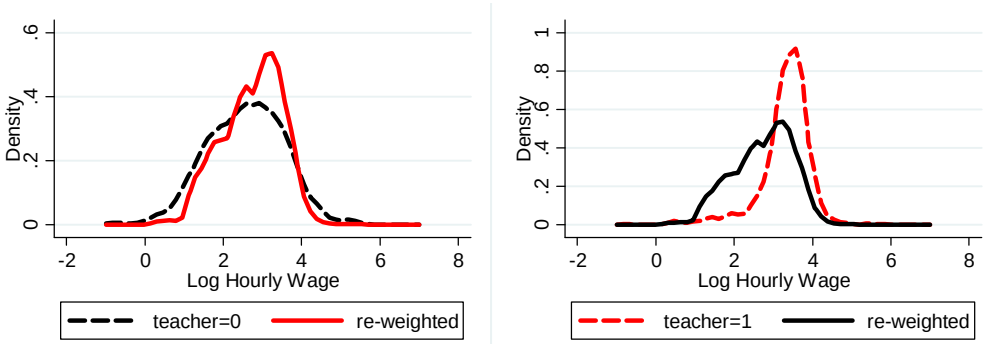
The results obtained for teachers and non-teachers using this composition are presented in figures 13 to 18 below.

FIGURE 13: Teachers and Non-teachers[6], 2000



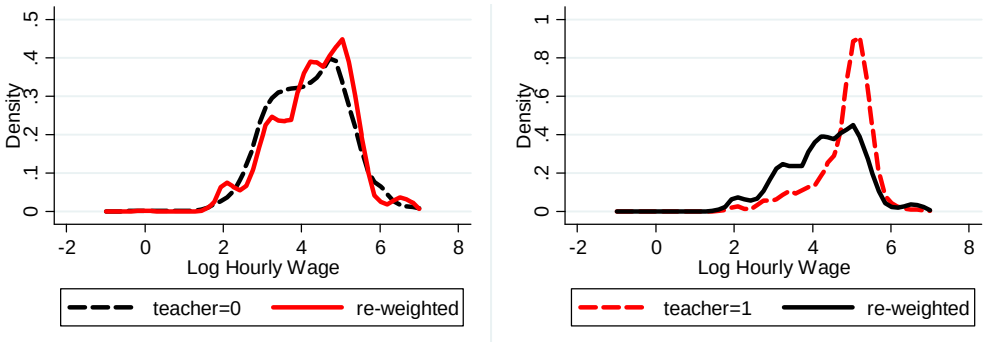
Source: LFS (March and September) 2000, Stats SA

FIGURE 14: Teachers and Non-teachers[7], 2007



Source: LFS (March and September) 2007, Stats SA

FIGURE 15: Teachers and Non-teachers[8], 2010

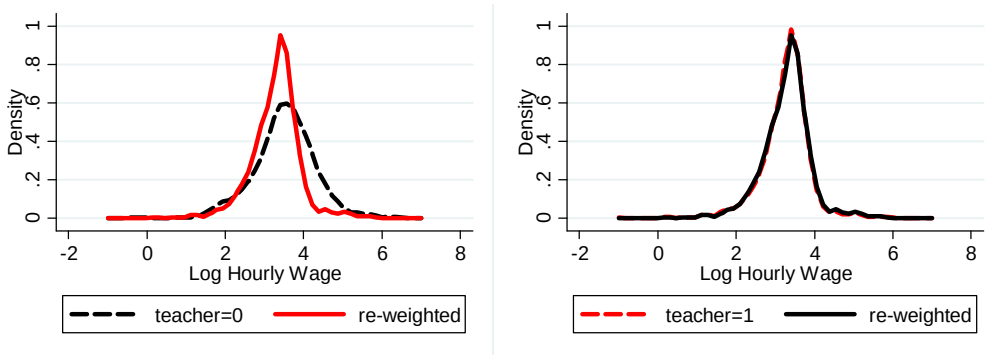


Source: QLFS 2010, Stats SA

[6] At least 12 years of educational attainment
[7] At least 12 years of educational attainment
[8] At least 12 years of educational attainment

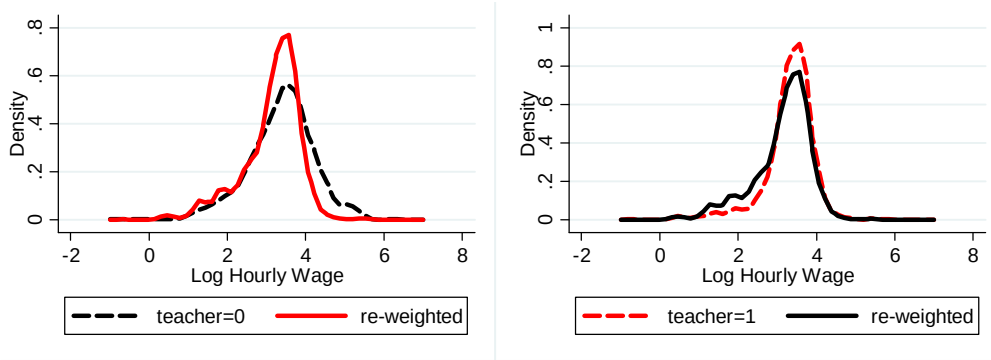
Figures 13, 14 and 15 present re-weighted counterfactual distributions for teachers and all non-teachers in 2000, 2007 and 2010, respectively. All three figures illustrate that if teachers had been remunerated according to the same structure as that faced by non-teachers, the distribution of wages would lie to the left of where it currently lies. Importantly, the counterfactual distribution is based purely on productive characteristics.

FIGURE 16: Teachers and Non-teaching professionals, 2000



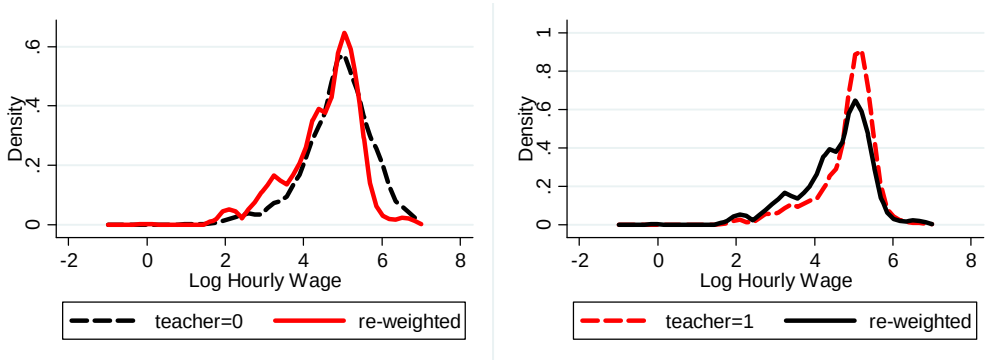
Source: LFS (March and September) 2000, Stats SA

FIGURE 17: Teachers and Non-teaching professionals, 2007



Source: LFS (March and September) 2007, Stats SA

FIGURE 18: Teachers and Non-teaching professionals, 2010



Source: QLFS 2010, Stats SA

Figures 18, 19 and 20 present the counterfactual distributions for teachers and non-teaching professionals. The left hand panel of the figures indicates that if non-teaching professionals, given their productive endowments, were remunerated according to the same structure as teachers, they would experience lower wages. Teachers, given their productive characteristics, remunerated according to the salary structure of non-teachers in the South African labour market, would experience a wage distribution that is roughly similar to what they experience if they were remunerated according to their current structure, with the exception of the right panel in figure 18. From figure 18 it appears that had teachers been remunerated in 2010 according to the salary structure faced by non-teaching professionals, they would have received lower wages than what they received as teachers. This is an important observation, particularly when considered together with the local polynomial smoothed line presented for the age-wage profile faced by teachers in figure 10.

3.5 Conclusion

From the wage analysis conducted, we can see that teacher wages are more similar to the wages of "lower order" professionals than they are to wages of individuals working in what might be considered "prestigious" professions. This is confirmed by the negative teacher premium for teachers when compared to non-teaching professionals. Furthermore, the level of returns to education and experience for teachers are considerably lower than they are for professionals in the labour market.

So how does one interpret the results obtained in the wage analysis? The fact that teachers receive relatively unattractive returns to educational attainment in comparison to non-

teaching professionals may be explained by various situations. Firstly, it may be the case that individuals who choose to become teachers may have higher preferences for non-wage benefits implied by the teaching profession. For example, they may be attracted by the job security, shorter working hours or perhaps simply a love of children and the actual activity of teaching. A second possibility is the potential realisation amongst individuals entering the teaching force that private sector wages are likely to be driven by productivity, inducing individuals with lower levels of unobservable productivity to enter the teaching profession. Finally, we may find that impatient individuals enter the teaching force as a result of the fact that teaching yields higher returns earlier in the life cycle. If the second of these explanations is in fact what is driving individuals to enter the teaching force, we have reason for concern.

So who is entering the teaching force? Are individuals who choose to become teachers inherently less productive than those who choose other professions? Section 4 investigates whether we are able to observe differences in the "productive potential" of individuals training to become teachers compared to those who are educating themselves in a different direction. It makes use of data on the Matric performance of university entrants into different faculties.

4. ACADEMIC PERFORMANCE OF FUTURE TEACHERS

This section provides a brief analysis of the academic ability (as measured by performance in matric exams) of students enrolled for first year studies in Education (Bachelor of Education, or BEd) and in other fields in one university. The overall objective is to ascertain whether or not a notable difference in performance is observed for BEd students in comparison to students enrolled in other degrees, and if so, how BEd students perform relative to other students.

4.1 Data

The data used for this analysis were obtained from the University of Stellenbosch and contain information on the mark obtained for each subject written by students enrolled in first year programs at the university. For the purpose of this analysis, first language and mathematics scores were used to gauge student performance and to assess the extent to which BEd students differed from others.

4.2 Performance across Faculties

The proportion of students who took higher grade mathematics as a subject in matric, as well as mathematics and language performance in matric are used as proxies for the academic ability of students entering university. In terms of handling differences in performance on the basis of higher grade (HG) and standard grade (SG), the marks students who wrote standard grade mathematics were weighted down by 0.25. Simkins[9] (2010) explains that in terms of the National Senior Certificate (NSC) introduced in 2008, the department of education envisaged a mark of 40 percent for higher grade mathematics prior to 2008 to be equivalent to 50 per cent for the NSC mathematics. Similarly, a mark of 72 per cent for mathematics literacy was deemed equivalent to 50 per cent for mathematics under the National Senior Certificate.

Mathematics marks were therefore adjusted according to the following formulas:

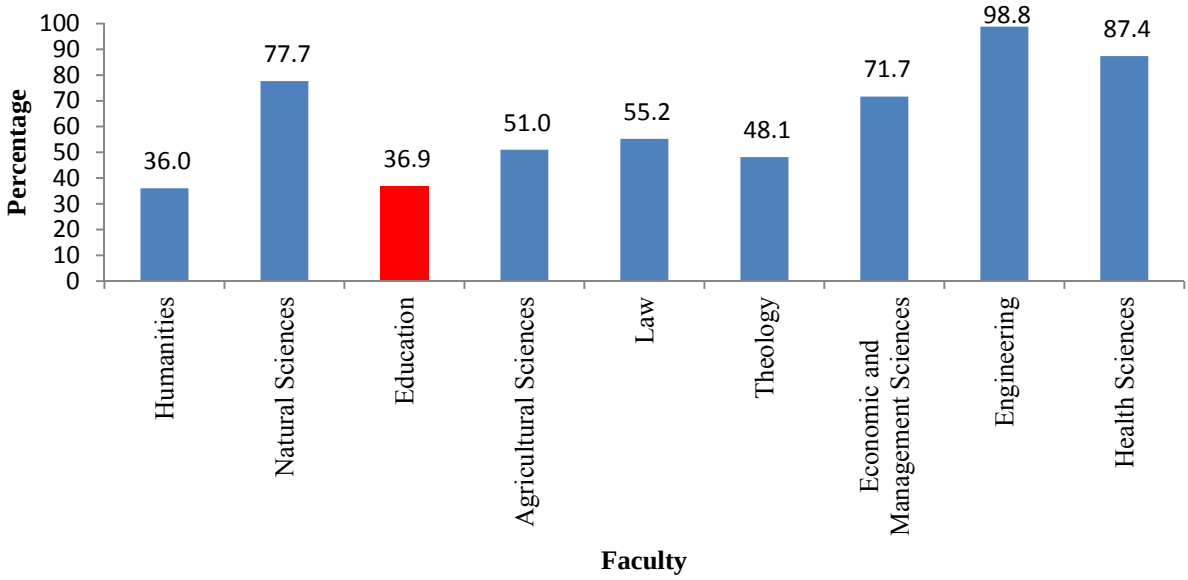
- SG mathematics = 0.75 x HG mathematics
- NSC mathematics = 0.8 x HG mathematics
- Mathematics literacy = 0.44 x HG mathematics

For students who took more than one language as a first language, the mean language mark across the languages was calculated.

The proportion of students who took higher grade mathematics in matric are presented in figures 26 for 2005, 2006 and 2007 combined. This is an admittedly crude measure of student ability.

[9] Prof. Simkins was commissioned to conduct a study comparing the Senior Certificate exams written prior to 2008 and the National Certificate introduced in 2008.

FIGURE 26: Percentage of Students who Took Higher Grade Mathematics, 2005 - 2007

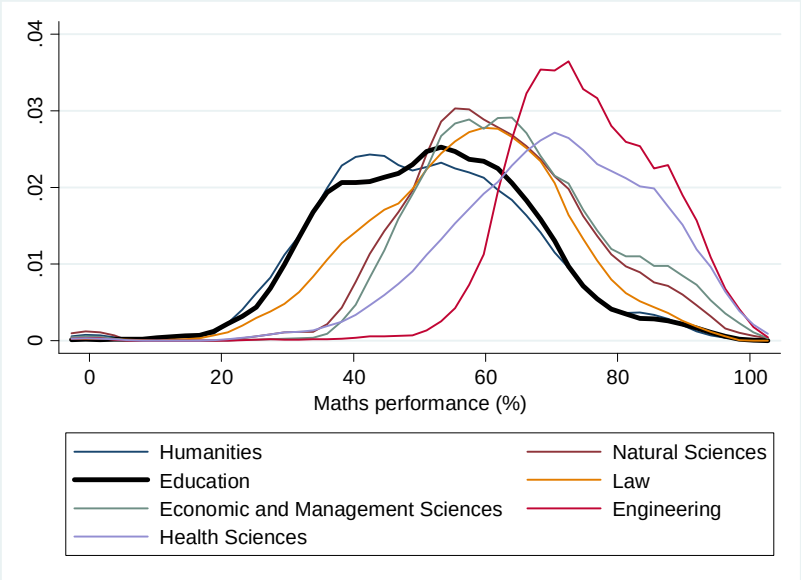


Source: Data for students enrolled at the University of Stellenbosch in first year programmes

From figure 26 it is observed that with the exception of the humanities faculty, the lowest proportion of students who wrote mathematics higher grade were those enrolled for in the faculty of Education. If we assume that higher-ability individuals are more likely to take higher grade mathematics than individuals with lower levels of ability, the data from figure 26 suggests the possibility of lower levels of academic ability amongst individuals enrolling for degrees in the Education faculty.

An analysis of the distribution of marks for students enrolled in different faculties is presented in figure 29 and 30 for mathematics and language, respectively.

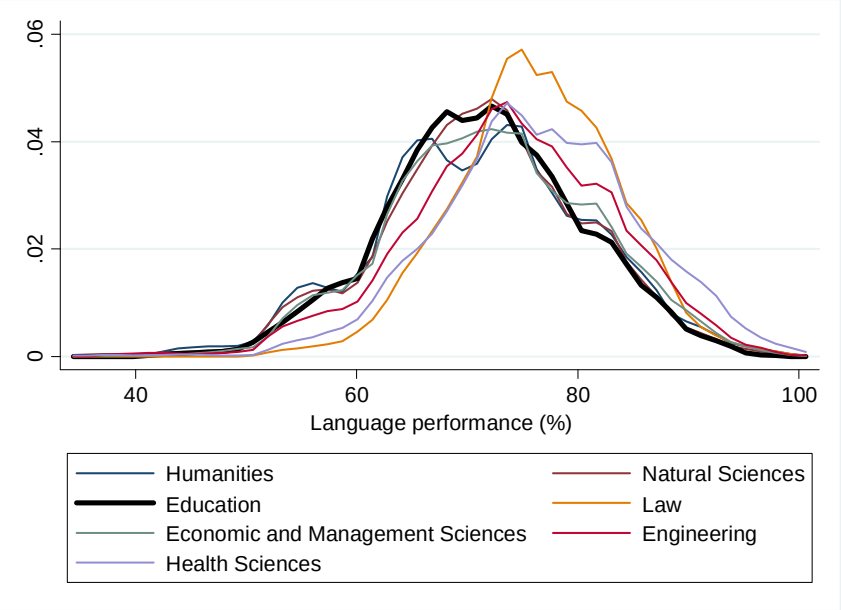
FIGURE 29: Performance in Mathematics, 2005 - 2009



Source: Data for students enrolled at the University of Stellenbosch in first year programmes

Figure 29 shows that the distribution of mathematics marks for students enrolled in the Education faculty lies to the left of the distributions for students enrolled in most faculties. At higher levels of achievement (roughly 75 percent and upwards), , the distribution of education students lies below that of all other students. Similarly, at low levels of achievement (40 percent and lower), the distribution of Education students lies above those of students enrolled in most other faculties (with the exception of Humanities at very low levels of achievement), indicating that the Maths performance of students enrolled in the faculty of education is weaker than that of students enrolled in other faculties. Figure 30 presents the distribution of marks for first language scores.

FIGURE 30: Performance in Language, 2005 - 2009



Source: Data for students enrolled at the University of Stellenbosch in first year programmes

The distribution of marks for first language performance for Education students does not lie as far to the left as it does for mathematics. However, we see that the distribution for Education students at higher levels of achievement is below those of students enrolled in other faculties. The difference in performance does not appear to be as stark as it is for mathematics.

Some evidence exists of weaker academic performance amongst students enrolled in the faculty of Education relative to students enrolled in other faculties. It must, however be acknowledged that the data used to obtain this result came from one university and the generalizability of this result is therefore questionable. Yet it still suggests that it may well be individuals with lower levels of productivity who are entering the teaching force – a worrisome prospect for a country facing such low levels of educational performance.

5. CONCLUSION

This paper investigated the remuneration structure facing teachers in the South African labour force and how this compares to that of non-teachers, concluding that teachers face a somewhat less attractive remuneration structure. In comparison to (better educated) non-teaching professionals the remuneration structure of teachers in unattractive, but relative to all non-teachers in the South African labour market, the remuneration structure faced by

teacher is. The wage profiles drawn in section 3 revealed that teacher wages are attractive to individuals with lower levels of educational attainment, with the profession becoming less attractive as individuals enhance their level of educational attainment and as labour market experience increases. A worrying aspect of teacher remuneration in South Africa is the flatness of the age-wage profiles faced by teachers. However, it appears as if this may be moving over time in line with what is observed for individuals employed in other professions, therefore potentially eroding some of the relative unattractiveness of the wage structure faced by teachers.

The brief analysis of the academic quality of students enrolled for first year studies at the University of Stellenbosch revealed that students enrolled to study in the faculty of Education perform somewhat worse than their counterparts in other faculties in Mathematics, and to a lesser degree in language, too. If we assume that wages are driven by productivity, then this may explain the relative unattractiveness of teachers' wage structure in comparison to that received by non-teaching professionals. Either way, the prospect is worrisome for the South African education system. Further research along the lines of what motivates individuals to become teachers would prove extremely useful in understanding who is drawn to the teaching profession, and potentially also how high-ability individuals can be attracted to the profession. The current remuneration structure relative to that of non-teaching professions seems unlikely on its own to ensure that top-ability individuals would follow a career in teaching.

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7. APPENDIX

TABLE A1: Non-Teaching Professionals in the LFS (2000 – 2007) and QLFS (2010)

NON-TEACHING PROFESSIONALS
Business Professionals
Legal Professionals
Archivists, Librarians And Related Information Professionals
Social Science And Related Professionals
Writers And Creative Or Performing Artists
Religious Professionals
College, University And Higher Education Teaching Professionals
Health Professionals (Except Nursing)
Life Science Professionals
Physical Sciences Technologists
Computing Professionals
Architects, Engineers And Related Professionals
Mathematicians, Statisticians And Related Professionals
Physicists, Chemists And Related Professionals

TABLE A2: Variables Included in augmented Mincerian wage function

VARIABLE	DESCRIPTION
13 years of education	A dummy variable taking the value of 1 if the worker has 13 years of education and 0 otherwise.
15 years of education	A dummy variable taking the value of 1 if the worker has 15 years of education and 0 otherwise.
16 years of education	A dummy variable taking the value of 1 if the worker has 16 years of education and 0 otherwise.
17 years of education	A dummy variable taking the value of 1 if the worker has 17 years of education and 0 otherwise.
Educ	A continuous variable reflecting the number of years of education an individual has completed.
$Educ^2$	A quadratic term (number of years of education squared) included to control for the possibility of non-linearities in the returns to education.
Exp	A continuous variable reflecting the number of years the worker has been employed in the labour market (calculated as [age – 6 – years of educational attainment])
Exp^2	A quadratic term (number of years of experience squared) included to control for the possibility of non-linearities in the returns to experience.
Union[10]	A dummy variable taking the value of 1 if the workers is a union member and 0 otherwise.
Female	A dummy variable taking the value of 1 if a worker is female and 0 otherwise.
Tenure	A continuous variable controlling for the number of years a worker has worked for their current employer.

[10] Not available in the QLFS 2010

Teacher	A dummy variable taking the value of 1 if the worker is a teacher and 0 otherwise.
Black	A dummy variable taking the value of 1 if the worker is black and 0 otherwise.
Coloured	A dummy variable taking the value of 1 if the worker is coloured and 0 otherwise.
Indian	A dummy variable taking the value of 1 if the worker is Indian and 0 otherwise.
White	A dummy variable taking the value of 1if the worker is white and 0 otherwise.
Agriculture	A dummy variable taking the value of 1 if the worker is employed in the agriculture, hunting, forestry and fishing industry and 0 otherwise.
Mining and Quarrying	A dummy variable taking the value of 1 if the workers is employed in the mining and quarrying industry and 0 otherwise.
Manufacturing	A dummy variable taking the value of 1 if the worker is employed in the manufacturing industry and 0 otherwise.
Electricity, Gas and Water Supply	A dummy variable taking the value of 1 if the worker is employed in the electricity, gas and water supply industry.
Construction	A dummy variable taking the value of 1 if the worker is employed in the construction industry and 0 if otherwise.
Wholesale and Retail	A dummy variable taking the value of 1 if the worker is employed in the wholesale and retail industry and 0 if otherwise.
Transport, Storage and Communication	A dummy variable taking the value of 1 if the worker is employed in the transport, storage and communication industry and 0 if otherwise.
Finance, Insurance and Business	A dummy variable taking the value of 1 if the worker is employed in the financial, insurance and business services industry and 0 otherwise.
Community, Social and Personal Services	A dummy variable taking the value of 1 if the worker is employed in the community, social and personal services industry.
Private Households	A dummy variable taking the value of 1 if the worker is employed in the private households industry.
Western Cape	A dummy variable taking the value of 1 if the worker is employed in the Western Cape and 0 otherwise.
Eastern Cape	A dummy variable taking the value of 1 if the worker is employed in the Eastern Cape and 0 otherwise.
Northern Cape	A dummy variable taking the value of 1 if the worker is employed in the Northern Cape and 0 otherwise.
Free State	A dummy variable taking the value of 1 if the worker is employed in the Free State and 0 otherwise.
KwaZulu Natal	A dummy variable taking the value of 1 if the worker is employed in KwaZulu Natal and 0 otherwise.
Northwest	A dummy variable taking the value of 1 if the worker is employed in Northwest and 0 otherwise.
Gauteng	A dummy variable taking the value of 1 if the worker is employed in Gauteng and 0 otherwise.
Mpumalanga	A dummy variable taking the value of 1 if the worker is employed in Mpumalanga and 0 otherwise.
Limpopo	A dummy variable taking the value of 1 if the worker is employed in Limpopo and 0 otherwise.

Source: LFS 2000 – 2007, QLFS 2010

TABLE A3: Means (and standard deviations) of variables used

VARIABLE	GROUP			
	Teachers (N = 6 274)	**Non-Teachers (N = 439 551)**	**Teachers (N = 3 225)**	**Non-Teachers (N = 47 037)**
	2000 - 2007		**2010**	
Log Hourly Wage	3.35	1.93	3.04	2.71
	(1.18)	(0.63)	(0.450)	(0.564)
Educ	13.71	9.55	13.73	12.66
	(1.45)	(3.91)	(1.321)	(1.185)
Exp	20.37	20.86	23.47	16.86
	(8.51)	(12.59)	(9.289)	(9.689)
Exp^2	414.94	435.14	644.16	524.09
	(362.21)	(660.47)	(445.45)	(555.52)
Union	0.80	0.35	-	-
	(0.472)	(0.478)		
Female	0.69	0.44	0.68	0.44
	(0.46)	(0.50)	(0.466)	(0.496)
Tenure	12.29	6.47	12.35	6.62
	(8.916)	(7.014)	(8.645)	(7.256)
Black	0.71	0.51	0.67	0.56
	(0.453)	(0.500)	(0.471)	(0.496)
Coloured	0.08	0.11	0.08	0.12
	(0.266)	(0.313)	(0.275)	(0.324)
Indian	0.03	0.06	0.04	0.06
	(0.171)	(0.243)	(0.187)	(0.273)
White	0.18	0.31	0.21	0.26
	(0.384)	(0.463)	(0.411)	(0.438)
Industry 1	0.00	0.02	0.00	0.03
	(0.023)	(0.142)	(0.000)	(0.168)
Industry 2	0.00	0.03	0.00	0.16
	(0.000)	(0.181)	(0.00)	(0.367)
Industry 3	0.00	0.16	0.00	0.01
	(0.014)	(0.366)	(0.000)	(0.109)
Industry 4	0.00	0.01	0.00	0.05
	(0.024)	(0.114)	(0.000)	(0.216)
Industry 5	0.00	0.03	0.00	0.21
	(0.000)	(0.180)	(0.000)	(0.405)
Industry 6	0.00	0.20	0.00	0.06
	(0.013)	(0.402)	(0.000)	(0.243)
Industry 7	0.00	0.06	0.00	0.20
	(0.033)	(0.240)	(0.000)	(0.398)
Industry 8	0.00	0.18	1.00	0.28
	(0.009)	(0.383)	(0.000)	(0.450)
Industry 9	0.99	0.29	0.00	0.00
	(0.050)	(0.454)	(0.000)	(0.027)
Industry 10	0.00	0.00	-	-
	(0.00)	(0.070)		
Western Cape	0.08	0.15	0.10	0.15
	(0.268)	(0.359)	(0.295)	(0.352)
Eastern Cape	0.16	0.08	0.15	0.08
	(0.368)	(0.271)	(0.362)	(0.278)
Northern Cape	0.02	0.01	0.04	0.02
	(0.133)	(0.118)	(0.184)	(0.127)
Free State	0.07	0.06	0.07	0.05
	(0.256)	(0.240)	(0.262)	(0.215)
KwaZulu Natal	0.20	0.18	0.21	0.18
	(0.403)	(0.388)	(0.408)	(0.308)
Northwest	0.08	0.06	0.05	0.05
	(0.266)	(0.235)	(0.218)	(0.216)
Gauteng	0.18	0.34	0.19	0.38
	(0.383)	(0.473)	(0.393)	(0.486)
Mpumalanga	0.06	0.06	0.08	0.06
	(0.2233)	(0.231)	(0.273)	(0.236)
Limpopo	0.16	0.05	0.11	0.04

	(0.365)	(0.218)	(0.307)	(0.197)

8. Note: Own calculations from LFS 2000 – 2007 and QLFS 2010, Stats SA

TABLE A4: Regression estimates for augmented Mincerian wage function on log hourly wages (2000 – 2007)[1]

Variable	Sub-Sample		
	Teachers	**Non-teachers (all levels of education)**	**Non-teachers (at least 10 years of education)**
Education	0.074 (20.11)***	0.111 (187.39)***	0.254 (165.36)***
Experience	0.018 (6.74)***	0.014 (28.17)***	0.029 (35.89)***
Experience^2	0.000 (-5.92)***	0.000 (-7.09)***	0.000 (-23.64)***
Female	-0.066 (-5.67)***	-0.162 (-48.57)***	-0.152 -35.46)***
Married	0.008 (0.67)	0.144 (42.75)***	0.141 (30.55)***
Union	0.259 (18.06)***	0.276 (76.11)***	0.227 (48.52)***
Tenure	0.007 (8.33)***	0.016 (68.53)***	0.018 (49.27)***
Constant	0.767 (3.22)***	-0.039 (-4.04)***	-1.817 -78.74)***
Adjusted R-Squared	0.1106	0.5421	0.4929
No. Of Observations	12142	252697	139040

Source: Own calculations from LFS (March and September) 2000 – 2007, Stats SA. Race, province and industry are controlled for in these regressions.

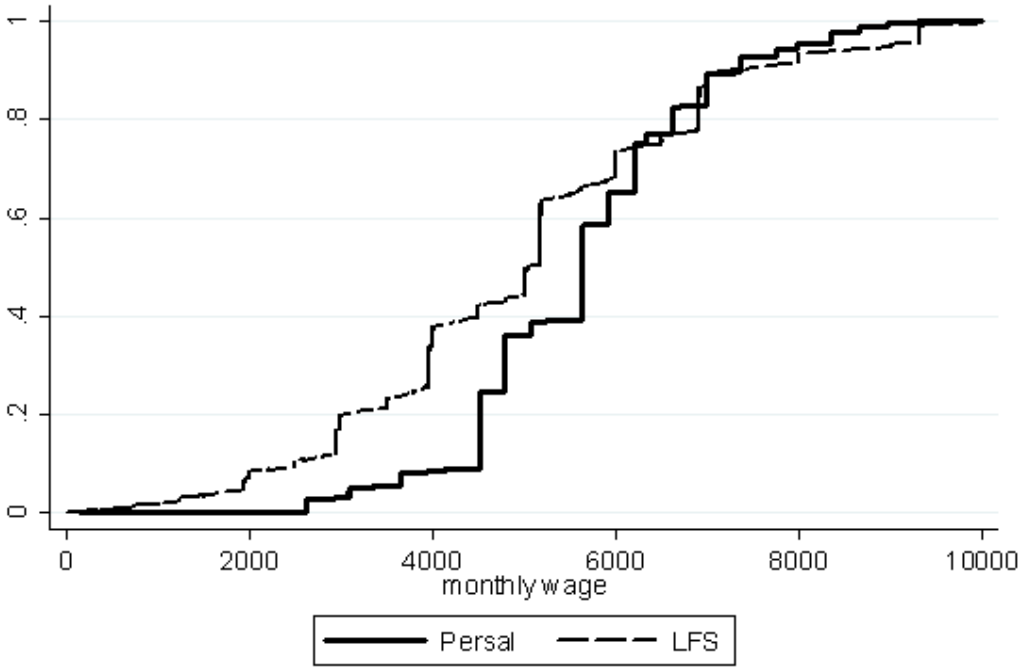
UNDER-REPORTING OF EARNINGS BY TEACHERS

The previous section compares teacher earnings to those of their non-teaching counterparts in the South African labour market. As mentioned before, it makes use of data from the Labour Force Survey (LFS). The validity of any of the results therefore is dependent on the validity of the information contained in the LFS.

The extent of underreporting of earnings by teachers in the LFS may be gauged by comparing the earnings data in LFS to what is actually paid to teachers by the Department of Basic Education. In order to do this, Persal data is used to compare reported earnings amongst teacher (in LFS) to wages paid to teachers (Persal). The comparison is conducted using the September 2001 Persal download and the 2001 LFS.

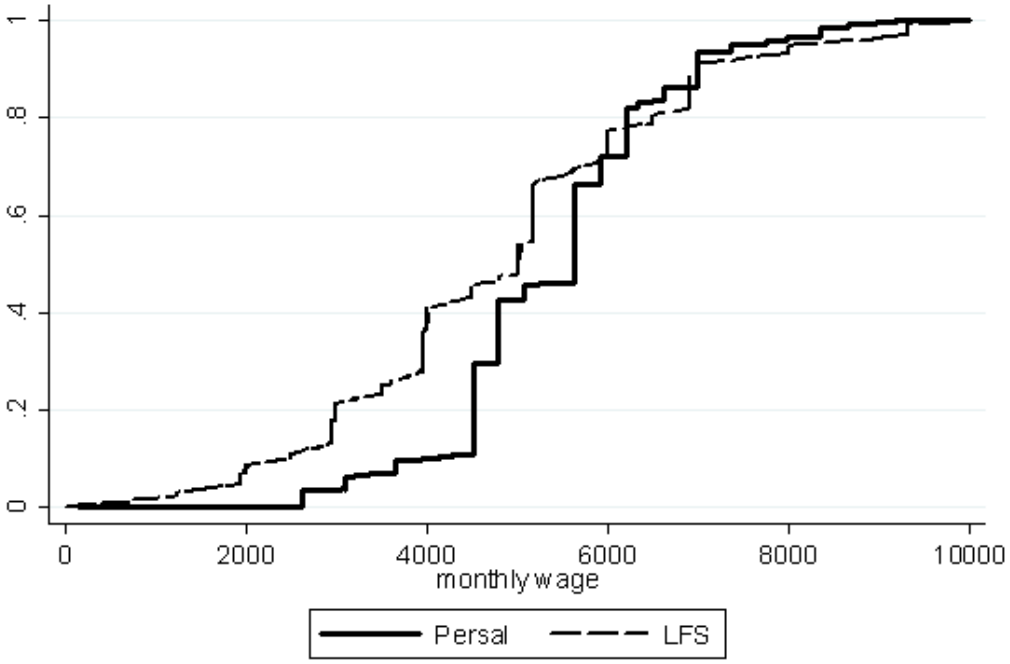
Using cumulative density functions (CDFs), we are able to see the proportion of teachers reporting a given level of monthly earnings in the LFS and how this compares to the proportion of teachers recorded as earning that wage from Persal data. CDFs for all teachers, for black teachers and for white teachers are presented in figures 15, 16 and 17 below.

FIGURE A7: Cumulative Density Functions: all teachers (2001)



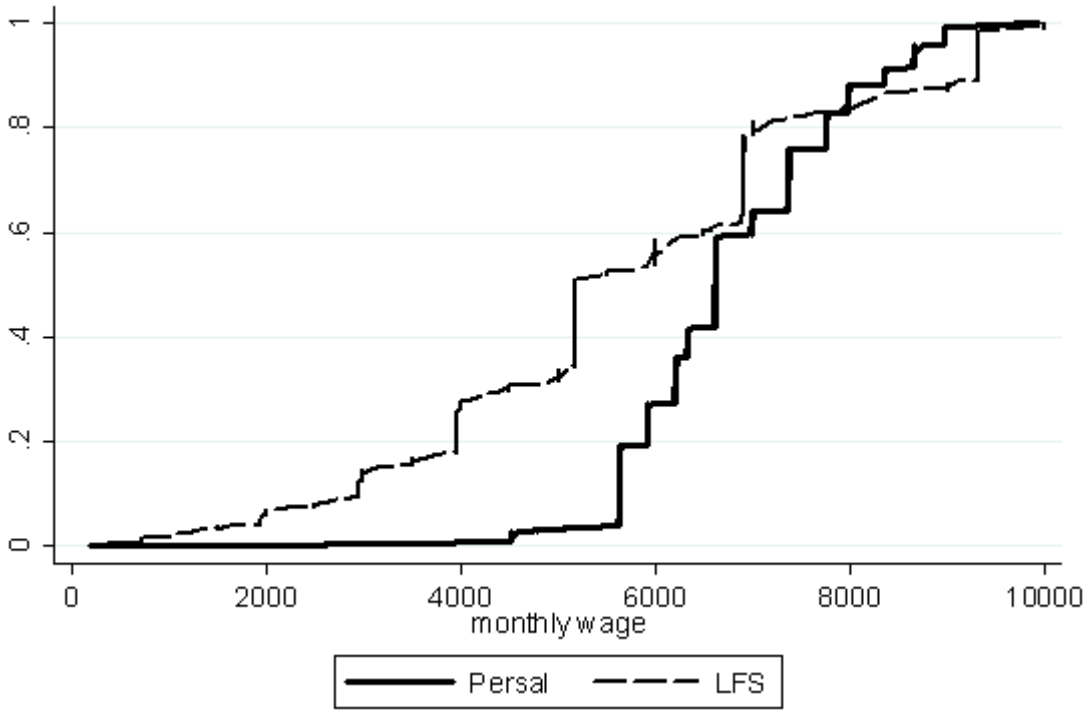
Source: Own calculations from Persal (September) 2001 and LFS (March and September) 2001

FIGURE A8: Cumulative Density Function: black teachers (2001)



Source: Own calculations from Persal (September) 2001 and LFS (March and September) 2001

FIGURE A9: Cumulative Density Function: white teachers (2001)



Source: Own calculations from Persal (September) 2001 and LFS (March and September) 2001

From the figures, it is clear that a fair amount of underreporting of earnings occurs amongst teachers in the LFS. The CDFs for teachers in the LFS lie above those of teachers in the Persal data at lower level of monthly wages indicating that a higher proportion of teachers in the LFS report lower levels of earnings than what is recorded in the Persal data. Similarly, a lower proportion of teachers report higher levels of monthly earnings in the LFS than what is recorded in the Persal data. Interestingly, it appears that the extent of underreporting amongst white teachers is slightly higher than it is for black teachers.

Given the evidence that reported earnings of teachers are lower than what is reflected in the Persal data, it is important to investigate the impact that this is likely to have on returns to education amongst teachers as well as on the age-wage profile of teachers. In order to investigate this impact, a new dataset is created with pooled values from Persal and the LFS. This is used to run a Mincerian wage regression in which the log of monthly earnings is regressed against the level of teacher training obtained as well as a quadratic term for age. A dummy variable is included for teachers captured in the LFS and the age and training terms are interacted with the LFS dummy. The results are presented in table 8 below.

TABLE A2: Regression estimates for augmented Mincerian wage function on log monthly wages (2001)

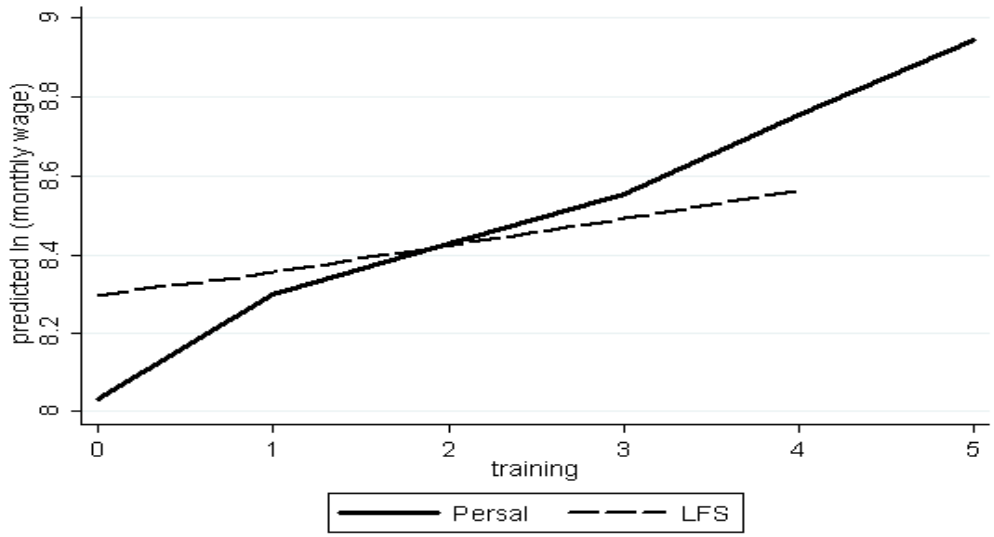
Variable	
Training	0.1602
	(69.03)***
Age	0.0324
	(11.92)***
Age ^{2}	-0.0003
	(-8.70)***
Training x LFS	-0.1013
	(-41.74)***
Age x LFS	0.0321
	(11.12)***
Age^2 x LFS	-0.0004
	(-11.17)***
LFS	-0.4433
	(-7.61)***
Constant	7.3243
	(133.12)***
R-squared	0.1192
No. of observations	316 724

Source: Own calculations from Persal (September) 2001 and LFS (March and September) 2001. Race, province and gender are controlled for in these regressions.

Interesting to note is that the LFS dummy variable is negative, indicating that teachers who are captured in the LFS report lower monthly wages on average than what is reported in Persal.

In terms of the returns to training implied by the coefficients obtained in table 8, figure 18 presents the returns to earnings for teachers captured in the LFS and those implied by the data contained in Persal.

FIGURE A10: Returns to training, 2001

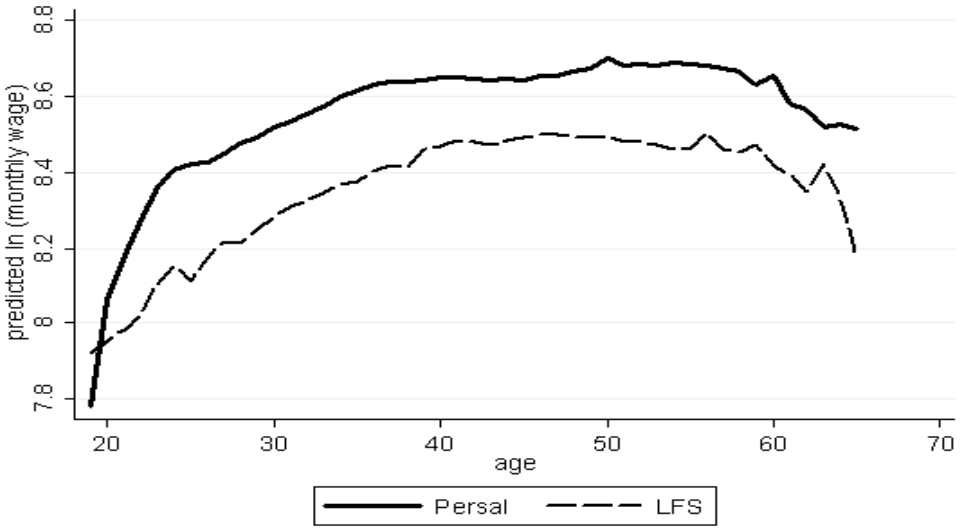


Source: Own calculations from Persal (September) 2001 and LFS (March and September) 2001

Figure 18 indicates that according to the data recorded in Persal, monetary returns to training amongst teachers appear to be higher at higher levels of training than what is reported in LFS, suggesting that the teaching profession for individuals with relatively high level of education is perhaps not as unattractive as is suggested by the earnings reported in the LFS.

The age-wage profile associated with earnings reported in the LFS and the Persal data are presented in figure 19 below.

FIGURE A11: Age-wage profile, 2001



Source: Own calculations from Persal (September) 2001 and LFS (March and September) 2001

From figure 19, we see that although the profile is lower at all age for teachers captured in the LFS, is appears that the age-wage profile takes a similar shape for both the LFS and the Persal data, with the exception of the oldest teachers in the data. For these teachers, monthly earnings in the LFS appear to drop by a significantly greater amount after the age of roughly 61 or 62 than they do in the Persal data.

This brief analysis has therefore provided evidence of underreporting of earnings amongst teachers in the LFS relative to what is recorded in the Persal dataset, with some indication that is more widespread amongst teachers with lower qualifications levels and an associated under-estimation of the returns to training in the LFS. It is thus important to bear in mind that the unattractiveness of the teaching profession implied in the previous section of this paper may be overstated.