

# Personnel spending pressures

## Hiring and promotion cuts with enrolment growth<sup>1</sup>

16 October 2017

*The years since 2013 have been unusual for the schooling sector insofar as it has seen substantial declines in educator numbers occurring at the same time as increases in enrolment numbers. The sector had not seen this type of trend previously during the last fifteen years. Enrolment increases, which have occurred largely as a result of an increase in births of around 10% in the years 2003 to 2005, have been concentrated at the primary level, but are moving up the grades and will begin affecting secondary schools in 2018. Educator declines have occurred, starting in 2011 or 2012, depending on which educators one counts. The number of permanently employed educators declined by 4% between 2010 and 2016. If non-permanent educators are included one arrives at a decline of 5%. These figures are from the Persal payroll data, but similar values are obtained if one uses the completely separate Snap Survey data.*

*At the primary level the overall learner-educator (LE) ratio in public ordinary schools rose by 1.5 learners (from around 30) between 2012 and 2016, whilst the secondary level ratio rose by 1.3 learners between 2010 and 2016 (from around 27). At the primary level, the sharpest rise in the LE ratio has occurred in Limpopo. At the secondary level North West and Eastern Cape have seen particularly steep increases. What is worrying is that the overall national patterns show that schools serving poorer communities have seen larger increases in their LE ratios.*

*Though the current (non-capital) budgets of the provincial departments have grown slightly in real terms (using the official consumer price index) since 2013/14, and are expected to grow in the years leading to 2020, this growth is too slow to keep up with the price inflation of the inputs used in education, in particular personnel, whose price increases are of course based largely on wage agreements. Even with some savings resulting from a shift towards younger teachers, the average cost of a teacher is increasing in real terms, and is increasing in excess of the budget trends. The inevitable outcome is thus cuts in personnel numbers.*

*Provincial expenditure data point to a further important factor: price pressures in health. The increasing costs of non-personnel items in the health sector have led to large increases in health's share of overall provincial expenditure, whilst education's share has declined in some years. The share of overall government revenue going to provinces has not increased to cater for increased health costs, thus these increases could be expected to put pressure on sectors other than health in provinces. Had basic education and health each retained the 2010 shares of their joint budgets, purchasing power in per learner terms in education would in fact have increased slightly, as opposed to declined, in the years following 2010. Importantly, education's share of GDP has in fact risen slightly in recent years, despite the declines in purchasing power. This reflects the underlying problem of weak economic growth since the global recession.*

*A part of the strategy adopted by all provinces, to varying degrees, in order to deal with budget constraints is to leave more vacated promotion posts empty, including schools-based promotion posts. This has occurred whilst the number people leaving these posts, and leaving the system, has risen considerably, for instance from around 4,000 to 6,300 between 2013 and 2015 in the case of schools-based head of department (HoD) positions. This trend*

<sup>1</sup> Report produced by Martin Gustafsson.

*in departures is driven in part by a rising number of managers reaching retirement age, but another trend, a worrying one, has been increasing departures from the system by these employees before retirement age. The latter could be a result of concerns amongst employees about the security of their pension funds caused by confusion during 2014 in this regard. Overall, people in school management posts declined by 8%, or around 6,400, between 2012 and 2016. This is very likely to impact negatively on school management. One province, Limpopo, has effectively halted the appointment of HoDs from 2014. Two other provinces which have seen particularly serious declines in schools-based managers are North West and Free State. Gauteng and Mpumalanga have ‘weathered the storm’ best.*

*Researchers have pointed to vital improvements in educational outcomes over the last ten or so years. Arguably, these improvements have been about as fast as one could expect from a schooling system. Building up the educational quality the National Development Plan envisages is necessarily a gradual and painstaking process. The relatively new context of austerity and cost-cutting have been impacting on schools, whose enrolments have been rising, in undesirable ways. The challenge lies in managing this process as carefully as possible to ensure that educational gains continue, despite the adverse conditions. It has become even more important to ensure that effective planning and monitoring occur. Four things can be emphasised.*

*Firstly, better monitoring of trends, particularly spending and headcount trends seen in the Persal payroll data, is needed within all the ten education departments. Certain things need to be monitored on a monthly basis, but for trends to be properly understood, it is also important for long-range historical patterns to be understood.*

*Secondly, more national work is needed that focusses on building alternative future scenarios, based on different strategies and assumptions. This is not easy work, and should not be left entirely to provinces. Some work has been done, and lessons need to be drawn from past mistakes.*

*Thirdly, silo effects in education departments, whereby for instance finance officials take decisions without consulting to a sufficient degree people managing school improvement, or school improvement people take decisions with unforeseen financial implications, need to be reduced.*

*Fourthly, experiences in other countries have demonstrated that in a context of cost-cutting and austerity drives, communication and transparency are vital. Why particular cost-cutting has occurred needs to be made clear. It should also be made clear how equity and fairness continue to be pursued, in other words what efforts have been made to ensure that the burden of cost-cutting has been spread as equitably as possible. If this is not clearly communicated, people’s motivation to work is adversely affected, and labour unrest is more likely to occur.*

## **1 Introduction**

This report provides an update on indicators such as number of employees in the nine provincial education departments, average employee costs and learner-educator ratios. To a large extent it follows approaches and formats seen in the 2015 review of remuneration produced by the Department of Basic Education (DBE) for the Presidential Remuneration Review Commission<sup>2</sup>. Appendix A of the current report is Appendix A from the 2015 review.

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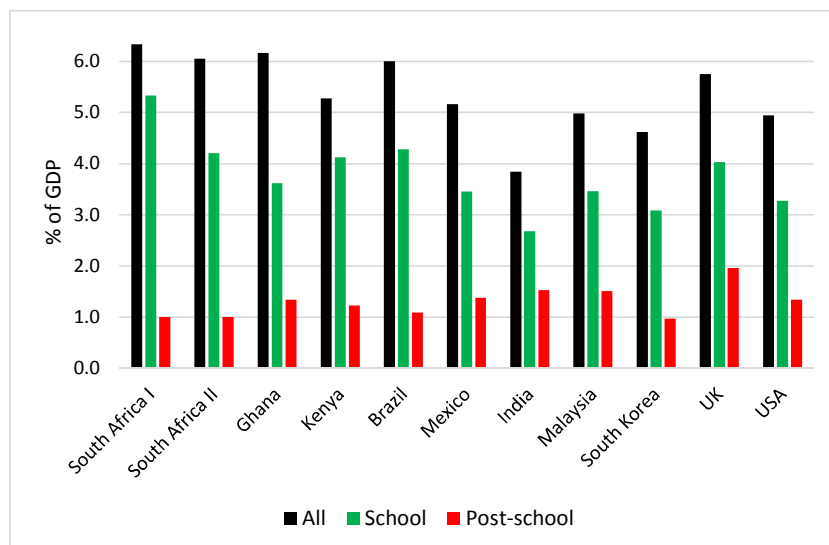
<sup>2</sup> *Basic education remuneration issues: Inputs to the Presidential Remuneration Review Commission* (dated 22 September 2015).

A key aim of the report is to clarify what the actual personnel trends have been in a context where there is often considerable uncertainty and conflicting information. As far as possible, the current report compares figures derived from different data sources. The report furthermore aims to bring to the fore critical information necessary to plan in the prevailing context of budget constraints.

## 2 The broader education spending patterns

Given how large the share of personnel spending is in basic education budgets, what can be spent on personnel is to a large extent driven by what can be spent on basic education as a whole. Figure 1 provides an international comparison of public spending on education relative to gross domestic product (GDP). Two versions of South Africa's percentages are presented: those calculated from official Treasury figures ('South Africa I'), and the percentages as they appear in the UNESCO Institute for Statistics online tables ('South Africa II' – the figures behind UNESCO's percentages are never made explicit). South Africa clearly invests considerably in education, relative to the comparator countries. Other countries were selected partly on the basis of the availability of values in the UNESCO system, and partly if they were countries commonly used as comparator countries in the South African policy discourse. South Africa's high spending on education is to a large extent driven by spending on *schools*. This emerges in particular if one uses the first set of percentages for South Africa (the non-UNESCO figures). What is *not* behind the overall high level of spending on education is high spending on *post-school* education. In fact, at that level South Africa's spending is low by international standards. These figures all suggest that a strong argument can be made for investing more in post-school education in South Africa. At least on the basis of Figure 1, it would be relatively difficult to build a strong case for more spending on school education.

**Figure 1: Public education spending over GDP ±2015**

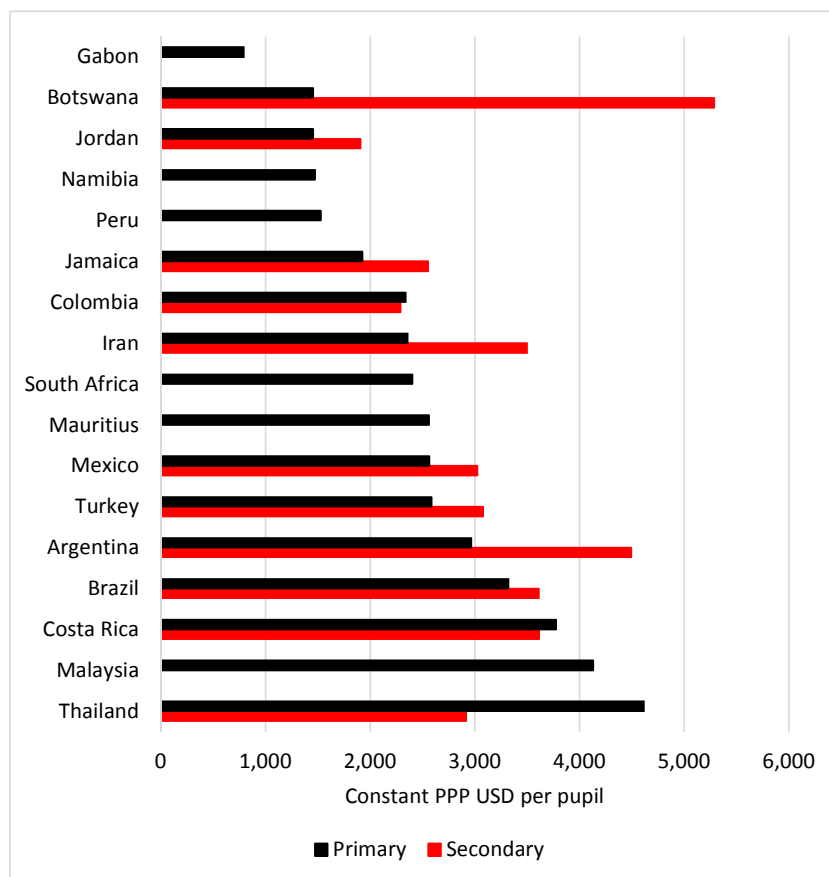


Source: UNESCO's figures are available at <http://data.uis.unesco.org>. These were obtained in May 2017. Values are from 2015, or the most recent year before that with data (but never before 2011). 'South Africa II' is from UNESCO. 'South Africa I' is calculated from Treasury figures for 2013/14. One reason to believe 'South Africa I' more than 'South Africa II' is, in the case of the latter, an unexplained discrepancy between the 'All' value and the sum of the school and post-school values. The pre-primary values have not been included in the UNESCO-derived school bars, but these are mostly very low (0.1% of GDP in the case of South Africa). The post-school values for UNESCO are the sum across three UNESCO categories: tertiary, post-school non-tertiary and vocational.

Whether one uses UNESCO figures or percentages derived from Treasury data, there has been virtually no change in the overall education spending over GDP figure for South Africa in the period 2011 to 2015.

International comparisons of education spending relative to GDP have been criticised for not taking into account demographic factors, in particular the proportion of the population which is in school, or should be in school. One way of dealing with this matter is to compare spending per learner. This is done in Figure 2 below, which uses only UNESCO values. Here we see that at the primary level South Africa's per learner spending is not exceptionally high or low, compared to the situation in other countries. South Africa's spending is considerably above that of its neighbours Botswana and Namibia, and on a par with that of Iran. However, it appears that at the secondary level per learner spending would be higher in Botswana than South Africa (though South Africa's spending at the secondary level is not shown in the graph, nor in UNESCO's system, this is about 30% higher than at the primary level).

**Figure 2: Spending per pupil in constant PPP USD**

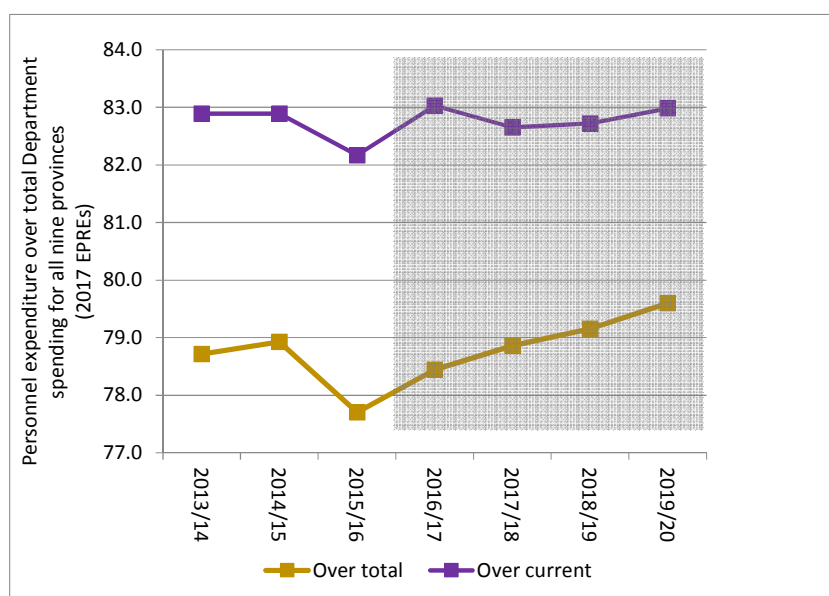


Source: Country data at <http://uis.unesco.org>, obtained July 2017.  
 Note: Countries are sorted according to primary-level spending. 'PPP USD' means constant purchasing power parity US dollars, in other words in terms of US dollars which have been adjusted to take into account the cost of living of countries. Secondary shown here is the average across lower and upper secondary. For several countries, no values were available. In the case of South Africa, spending per secondary learner would be around 30% higher than that for every primary learner. Countries are all upper middle income countries. Countries were furthermore selected based on data availability and their familiarity to South Africans.

A key ratio that receives much attention by planners and researchers in South Africa is the ratio of personnel spending to non-personnel spending in basic education. This ratio should

ideally be close to 80 (personnel) to 20 (non-personnel), according to the 1998 school funding norms, and the 2006 norms which replaced the original norms<sup>3</sup>. It seems implied by the norms that non-personnel spending should include capital spending. Yet it is also useful to view personnel spending as a percentage of just *current* spending, partly because capital spending can often be delayed or accelerated, depending on budget availability, which creates trends in the percentages which are difficult to interpret. Figure 3 reflects personnel spending over all provincial education department spending, and over just current spending<sup>4</sup>. In the three financial years 2013/14 to 2015/16, years for which final audited figures are available, the percentage is close to 80%, and arguably within the parameters set by the norms (the ‘Over total’ curve is probably what the norms refer to). The clear dip in 2015/16 mirrors the constraining of hiring and promotions in this year discussed in the rest of this report.

**Figure 3: Percentage spent on personnel (national)**



Source: The Estimates of Provincial Revenue and Expenditure (EPRE) Excel files published on the National Treasury website in 2017, which in turn reflect figures from the official provincial documents carrying the same name (and finalised in 2017).

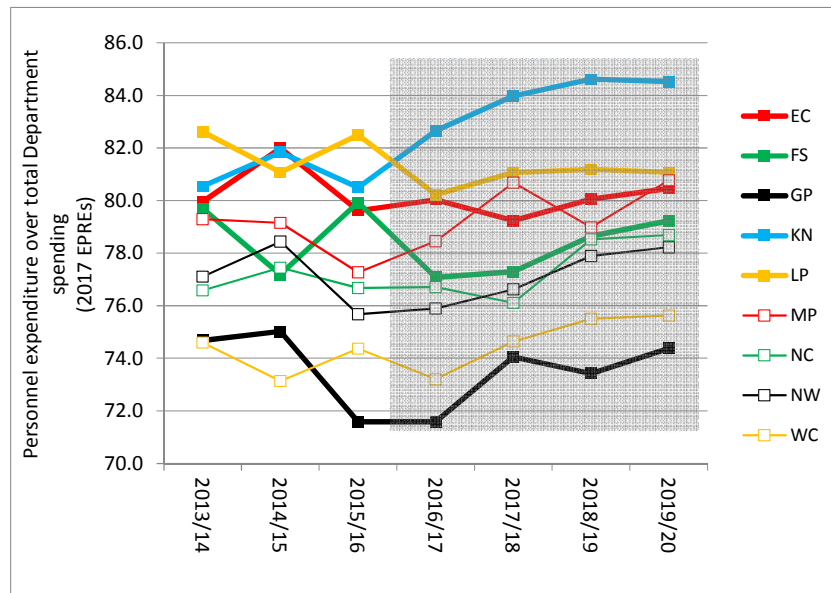
Note: All non-capital spending was counted as current for the purposes of this graph and the remaining graphs in this section. This means current includes the following categories in the financial statements: Current payments; Transfers and subsidies; Payments for financial assets. The grey shading (here and in subsequent graphs) indicates ratios based on non-final (or non-audited) financials. These ratios can change fairly substantially when figures are finalised. The 2016/17 ratios are based on ‘revised estimate’ figures.

The province-specific trends are illustrated in the following two graphs. The variation across provinces is large. One striking trend is that KwaZulu-Natal’s percentages, which were already high up to 2015/16, are expected to rise further into the future. Very large fluctuations in recent years in Free State in Figure 5 are also noteworthy.

<sup>3</sup> Government Notices 2362 of 1998 and 869 of 2006.

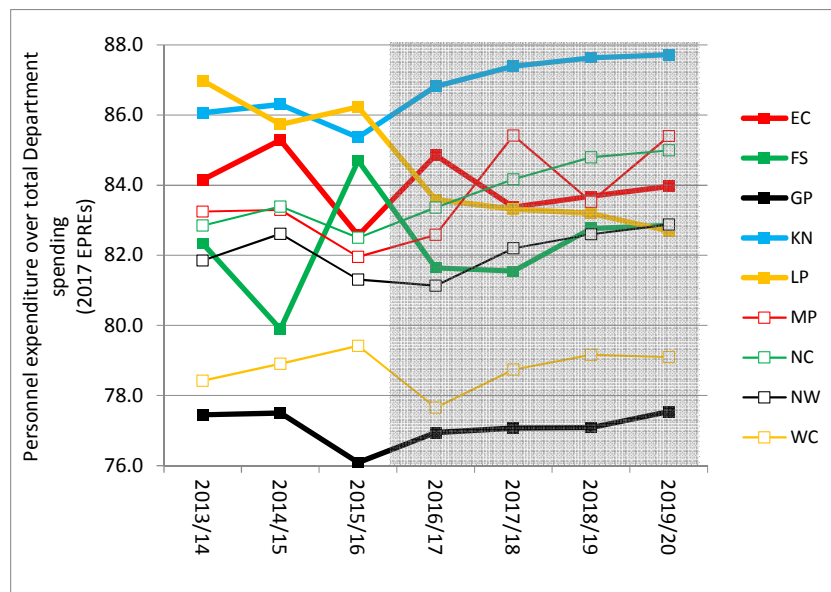
<sup>4</sup> Note the note below the graph which specifies how ‘current’ is understood.

**Figure 4: Percentage spent on personnel (provinces – over total)**



Source: See Figure 3.

**Figure 5: Percentage spent on personnel (provinces – over current)**



Source: See Figure 3.

It is worth emphasising that the ratios referred to above should be calculated with care, and with a proper awareness of the possible unreliability of financial figures which are not final audited figures. It is fairly common to find ratios in the public domain which are not correct by a large margin<sup>5</sup>.

The following four graphs focus on the purchasing power of current budgets, meaning the ability of budgets to pay for a constant quantity of personnel and non-personnel (current) inputs. For this analysis, simply using the official consumer price index (CPI) can be misleading, as the prices of education inputs, in particular personnel, have increased faster

<sup>5</sup> For example, many of the provincial percentages in Deloitte's (Department of Basic Education, 2013: 36) review of post provisioning are higher than they should be.

than the prices of other goods in the economy, probably for every year since 1994. A special education price index was devised. This index was the same for all provinces, and was calculated using the following assumptions. It was assumed that 80% of the current budget goes to personnel. Price increases on the non-personnel side were assumed to be those of the CPI. On the personnel side, costs were assumed to escalate in line with annual salary agreements<sup>6</sup>, a 1.0% a year increase linked to the IQMS<sup>7</sup> performance management system, and a 0.3% annual *decline* associated with the fact that gradually younger, and less costly, teachers are replacing a bulge of older teachers. The 2016/17 to 2017/18 CPI and salary agreement increments were assumed to apply to all periods beyond that time.

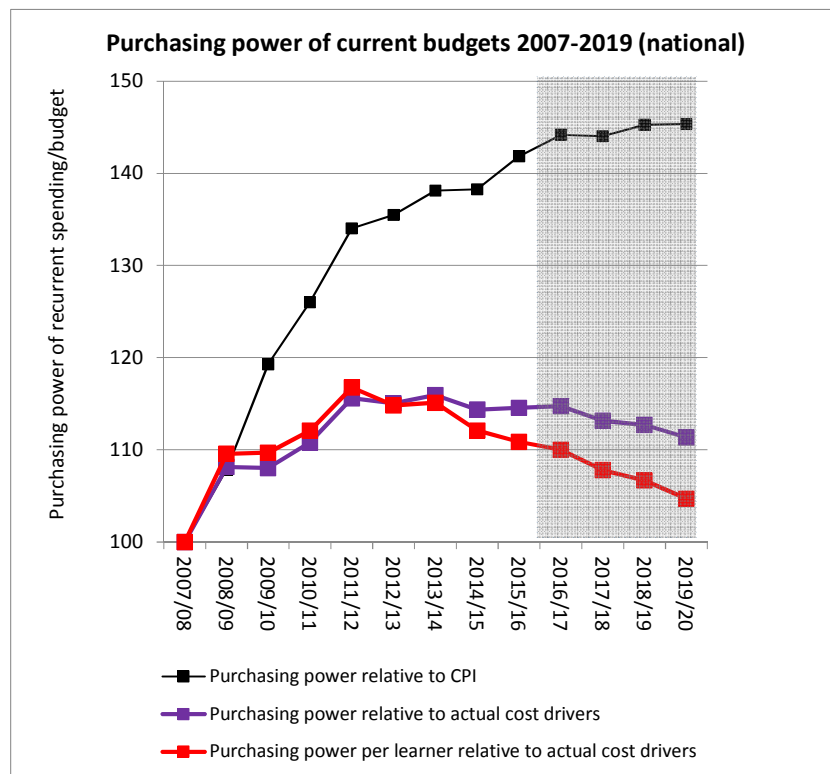
Figure 6 below provides the national picture, for a longer historical time period. Relative to CPI, there has been an increase in the total real spending of the nine provincial education departments, though from 2016/17 there is virtually no change. Relative to actual costs, however, the trend has been negative since 2013/14, and the downward trend is expected to continue in the future, according to medium-term budgets released in 2017. The drop of 1.5 index points between 2013/14 and 2014/15 corresponds to a decline of R3.0bn (in 2016/17 Rand terms), whilst the largely planned drop of 4.4 points between 2013/14 and 2019/20 comes to R9.0bn (also in 2016/17 terms). A third curve in Figure 6 calculates the actual purchasing power in terms of each learner (with learners from all grades, including Grade R, counted). Because enrolments are increasing, this curve presents the steepest downward trend. What could be bought for each learner in the period 2007/08 to 2011/12 increased substantially, by 17%. However, purchasing power declines after 2011/12 mean that by 2019/20, what can be bought for each learner would be only 4.7% higher than the level seen in 2007/08, and below the 2008/09 level.

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<sup>6</sup> Apart from published annual increments, what was also used was the overall increase of 7.8% brought about by Resolution 4 of 2009 of the Education Labour Relations Council (ELRC), informally known as 'OSD II'. The 5.4% increment brought about by OSD I (OSD Resolution 1 of 2008), which took effect in January 2008 (so in the 2007/08 financial year), is taken into account in the base values for 2007/08. Department of Basic Education (2012) provides further details on the costs of OSD.

<sup>7</sup> Integrated Quality Management System.

**Figure 6: Purchasing power of current budgets 2007-2019 (national)**

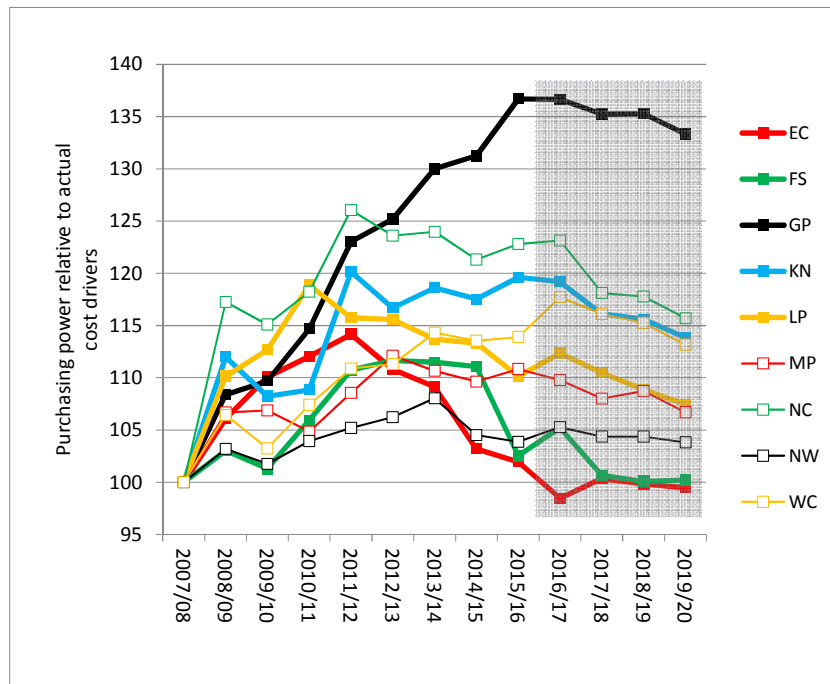


Source: See Figure 3. Moreover, earlier sources of this kind available on the Treasury website were used. The financial years 2011/12 and 2012/13 were unusual in the sense that considerable downward adjustments were effected to final audited expenditure figures between reports released in 2014 and reports released in 2015. The more recent values published in 2015 (and in subsequent years) were obviously considered correct. Importantly, all years exclude functions moved from the provincial to national level between 2014/15 and 2015/16, namely FET colleges and adult education. Note: Here and in the following two graphs, an index was created which pegs 2007/08 values to 100.

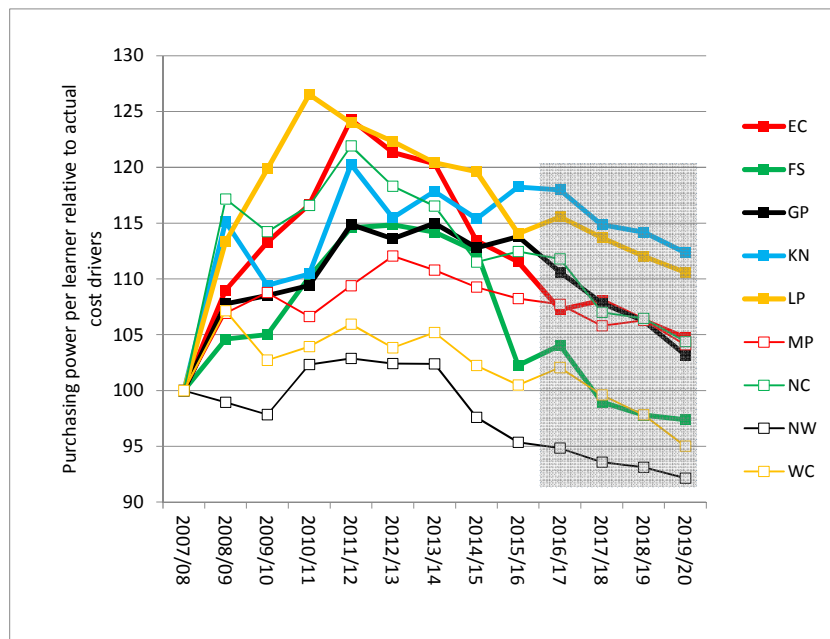
What is clear from the next two graphs, Figure 7 and Figure 8, is that provinces have experienced vastly different purchasing power trends. Gauteng, which accounts for around 16% of spending and saw the largest overall expenditure increases, has been an important driver of the overall national rise in the purchasing power of the basic education. In practical terms, this means that increases in the number of teaching posts would have been most likely to occur in this province. Two provinces, Free State and Eastern Cape, saw a 2015/16 purchasing power which was about as low as that of 2007/08. Note that the Figure 7 analysis does not take into account changing demand, for instance the need to employ more teachers as enrolments increase. It simply gauges, for instance, the ability of provinces to employ as they have in the past. Gauteng is the only province which has been able to prolong its expansion beyond 2012/13, but that prolongation extends only to 2015/16. For the years 2016/17 and beyond (all years for which final audited figures are not readily available, meaning one cannot be very certain of the eventual numbers), all provinces see declines in their overall purchasing power. Turning to Figure 8, taking demand in the form of enrolment into account worsens the downward trend. The post-2015/16 downward trend is particularly steep in Gauteng (2.4 percentage points a year) and Northern Cape (2.1).



**Figure 7: Purchasing power of current budgets 2007-2019 (provinces)**

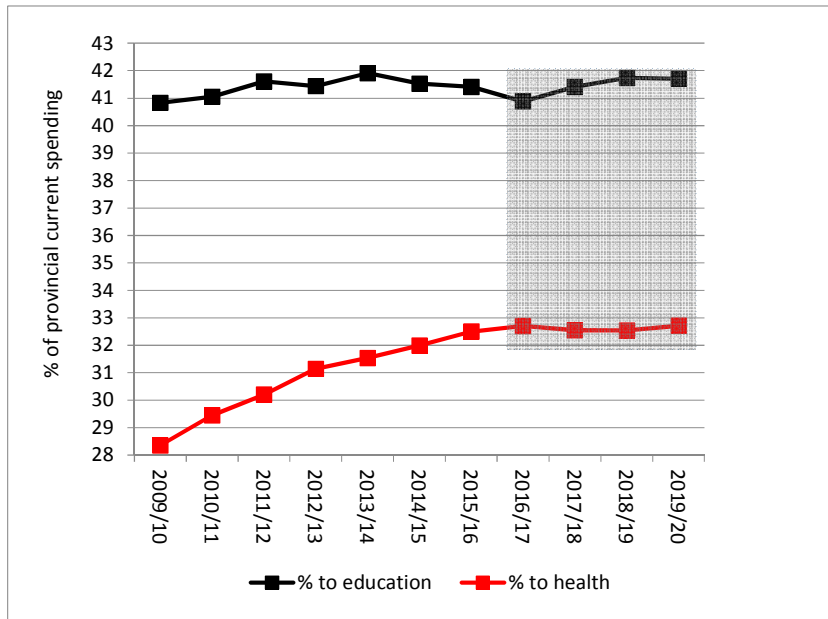


**Figure 8: Purchasing power of current budgets 2007-2019 per learner (provinces)**



A key question is whether purchasing power declines are due to the fact that provinces are prioritising education less, relative to other expenditure votes. The next graph indicates clearly that health has received an increasing slice of the ‘cake’, whilst education’s share has remained roughly static, though between 2013/14 and 2016/17 education lost a whole one percentage point, representing around R5bn in 2016/17 Rand terms. In fact, a key challenge experienced by provinces has been rapid increases in the costs of non-personnel inputs in health, in particular in the areas of equipment and medical supplies. The increases in health’s share has been considerably larger than the decline in education’s share, implying that not just education has been adversely affected by higher costs in health.

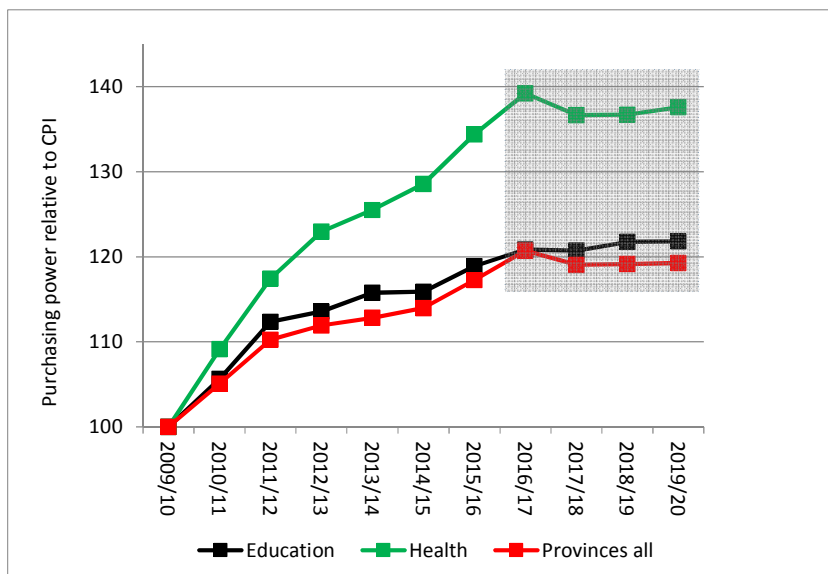
**Figure 9: Education and health spending percentages 2009-2019 (national)**



Note: The curves represent the sector's non-capital spending divided by the total of all provincial non-capital spending.

Figure 10 displays the logical corollary of the previous graph, namely that in real CPI-adjusted terms, education expenditure has grown more slowly than health spending. Average annual real growth in total provincial spending over the 2009/10 to 2015/16 period has been 2.7%. Roughly, education has followed this trend, while real growth for health spending has been much higher.

**Figure 10: Education and health real spending 2009-2019 (national)**



Note: The reason why the education curve here and the CPI curve in Figure 6 carry different values is that the base years are not the same.

Per learner spending does not differ much across provinces. For instance, in 2015/16 the province spending most (in per learner terms), Northern Cape, was spending just 16% more than the province spending least, KwaZulu-Natal. However, as seen in Figure 11, the share of the provincial ‘cake’ devoted to education differs to a much larger degree. While Limpopo spent 47% of the ‘cake’ in 2015/16, Western Cape’s figure was just 35% - this is a difference of 34%. There are a number of factors which explain this pattern, including higher enrolment and repeater rates in Limpopo, and a stronger presence of own provincial revenue in a richer province such as Western Cape.

**Figure 11: Education’s share of provincial spending 2009-2019**

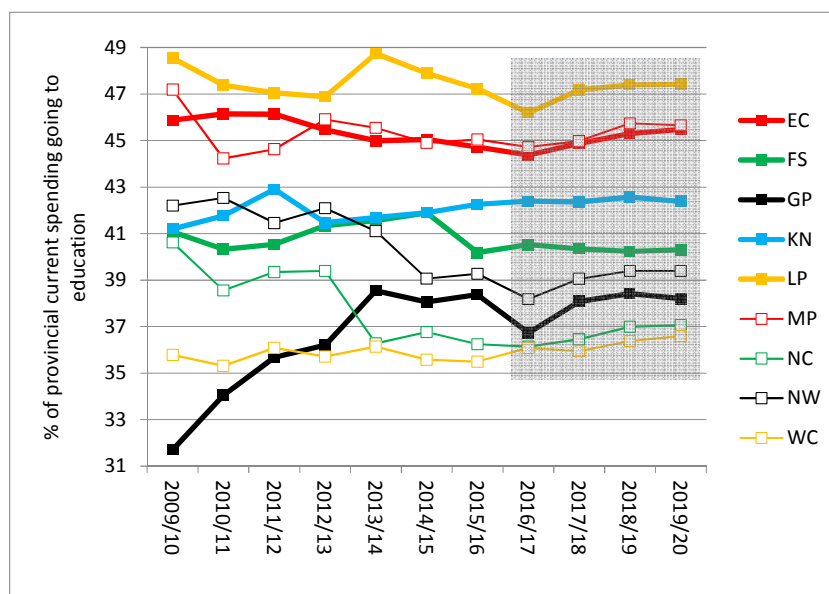


Table 1 unpacks factors contributing to the decline in the education sector’s purchasing power. In per learner terms, this decline was 2.6% over the four-year period 2010-2011 and 2014-2015 (here 2010-2011 is the average across 2010/11 and 2011/12, with the same applying to 2014-2015). However, if one ignores enrolments, the purchasing power of the sector, using actual price pressures such as the wage agreements, increased by 1.1%.

The last three rows of the table provide ‘what if’ scenarios. If the joint spending on education and health had not changed, *but* the ratio of education to health spending had remained at the 2010-2011, then education’s spending situation would have been better in 2014-2015. Specifically, what could be purchased for each learner could have increased slightly, by 0.5% (instead of declining by 2.6%).

There was a small decline in the provinces’ share of the overall equitably distributed amount (which also goes to national departments and local governments). There was thus no apparent upward adjustment in the provincial share to cater for rising health costs. In the two periods in question, the provinces’ share declined from 44.1% to 42.7%. Had the level in 2014-2015 been 44.1% (and not 42.7%), with all other factors remaining unchanged, the 2014-2015 situation would have been a bit better, with per learner purchasing power being 0.6% higher.

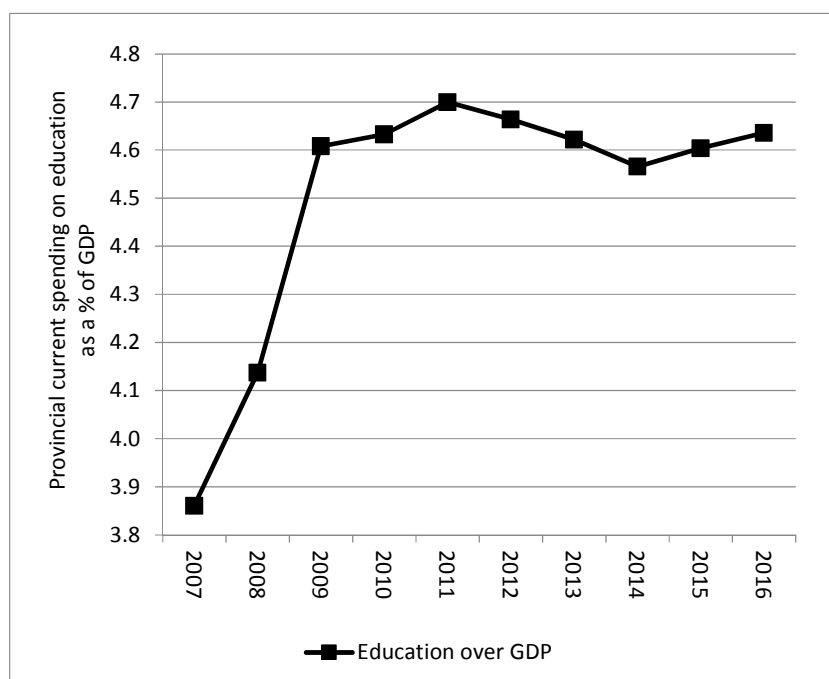
**Table 1: 'What if' alternatives to the per learner resourcing trend**

	2010-2011 per learner spending (non- capital)	2014-2015 per learner spending (non-capital) expressed in 2010-2011 purchasing power Rands	% above 2010-2011 figure	% above actual 2014- 2015 figure
Actual	10,980	10,691	-2.6	0.0
If enrolment had remained the same.		11,096	1.1	3.8
If education and health had each retained the 2010-2011 share of their joint budgets.		11,038	0.5	3.3
If the provincial share in the division of revenue of 2010-2011 had been retained.		11,041	0.6	3.3
If wages had followed CPI.		11,388	3.7	6.5

Had wages followed CPI, the situation in 2014-2015 would have been very different, with the per learner purchasing power being 3.7% higher than in 2010-2011. Clearly, above-inflation wage increments are a major factor explaining the budget pressures in education.

Finally, Figure 12 offers a sobering picture of a key underlying problem, namely slow economic growth. Relative to GDP, spending on basic education has fared relatively well. Between 2007 and 2009 there was an enormous increase in the share of national income going to the sector, from 3.9% to 4.6%. This occurred as a result of both lower-than-expected GDP, resulting largely from the global recession, and to high wage growth resulting partly from the OSD reforms. Thereafter, basic education's share of GDP lost some ground, though during 2014 to 2016 the share increased a bit. The fact that an increasing share of the economy can occur simultaneously with declining purchasing power in part reflects the fact that the economy has not grown as one would have hoped.

**Figure 12: Provincial education over GDP**



Source: GDP values used for this graph are in current Rand terms as reported by Stats SA's official GDP publications (and accompanying Excel files). The most recently published GDP value for each year was used.

### 3 Problems in the financial reporting systems

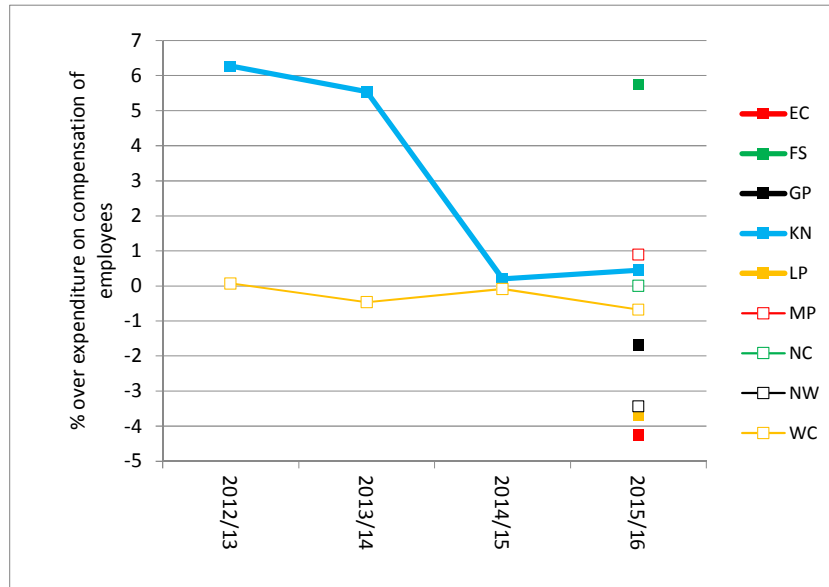
One worrying phenomenon, in relation to the monitoring of personnel spending but also education planning in general, is that *provincial education departments are not publishing their annual reports (which include the official final audited financial figures) on their websites as they should*. For instance, at the start of May 2017, only one provincial department, namely KwaZulu-Natal, had its *2015/16 annual report* uploaded on its website<sup>8</sup>. By May 2017 it is virtually impossible for the annual reports for the other eight provinces for 2015/16 not to be finalised. The problem is simply that provincial departments have not prioritised the publication of their annual report on the web. This is worrying from a public accountability viewpoint, and worsens the problem whereby researchers and watchdog organisations use incorrect statistics in their analysis. The problem is not unique to the 2015/16 reports. Delays have occurred in relation to previous years too. On the positive side, National Treasury's publication, through its website, of Excel files containing provincial budget and spending figures is consistent and very useful, with figures appearing here often not being available on any provincial website. However, these files contain only figures, not the narrative and non-financial information one would find in an annual report.

The next graph illustrates the ability of provinces to remain within budget in the area of personnel spending. Only for two provinces, KwaZulu-Natal and Western Cape, were multi-year trends analysed. For the other seven provinces, the situation for 2015/16 is illustrated. The variation across provinces is large, with Free State spending 6% more than what was budgeted for on 'compensation of employees' (personnel) in 2015/16, whilst Eastern Cape *under-spent* by around 4%. These figures are worrying. They probably reflect not just problems in the way personnel spending is managed during the year, but also problems in the

<sup>8</sup> The reports were initially searched for by going to the home page of the website and then following the logical links. In addition, reports were searched through Google to deal with the possibility that reports were archived in obscure places on the websites.

way the budgets are calculated in the first place. *In 2015/16, more provinces under-spent than over-spent.* If one adds up the provincial figures one obtains a national *under-spend* of 1.2%. In the context of the staffing problems described in the rest of this report, this under-spending is problematic.

**Figure 13: Over-expenditure on compensation of employees**

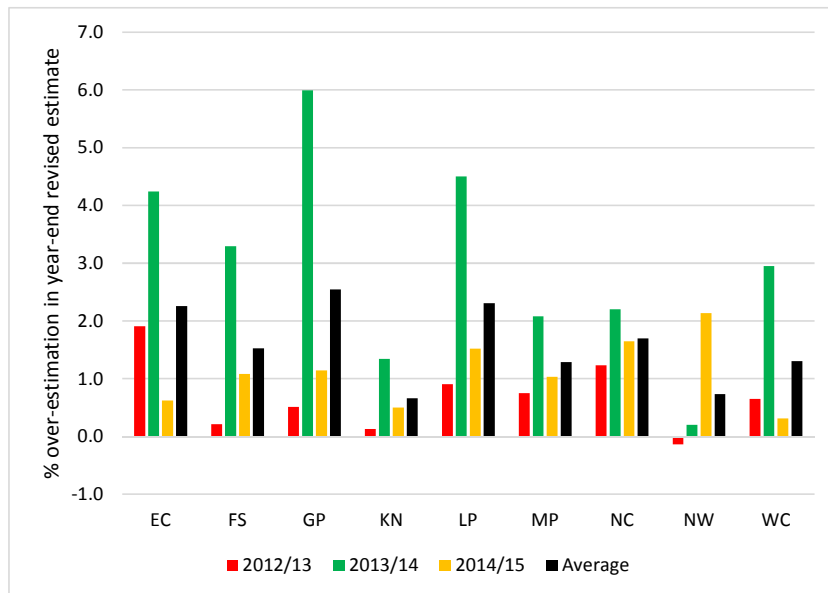


*Note: Each point in this graph is the most recent audited 'actual expenditure' value, divided by the budgeted expenditure at the start of the financial year, according to the Estimates of Provincial Revenue and Expenditure (EPRE) documents.*

The following graph is telling insofar as it illustrates the difficulties provincial departments experience in establishing actual expenditure on personnel. At the end of the financial year, at the end of March, departments need to estimate how much has been spent in the preceding year. They arrive at estimates, which are published in the Estimates of Provincial Revenue and Expenditure (EPRE) reports. Several months later, in around September, actual spending figures for the past financial year are finalised. *These actual figures are nearly always lower than the estimates calculated in March, and often the gap between the two figures is considerable.* This gap is what Figure 14 illustrates. For example, in North West, the personnel spending figure for the 2014/15 financial year calculated in March 2015 was around 2% higher than what the figure was finally found to be. Discussions with provincial officials involved have revealed that provincial departments often do not have the tools and skills necessary to derive accurate and up-to-date estimates of spending in a context where the financial accounting system follows a modified cash basis of accounting<sup>9</sup>. The graph can be considered a succinct illustration of capacity problems which are likely to undermine effective management of the large workforces employed by provincial education systems. Without good information on personnel spending, decisions on whether the hiring of additional teachers is affordable, or what the optimum budgets in the next financial year should be, become extremely difficult to make well.

<sup>9</sup> National Treasury, 2017: 34.

**Figure 14: Over-estimation of year-end revised estimates (compensation of employees)**



Source: Estimates of Provincial Revenue and Expenditure standardised tables in Excel format available at <http://www.treasury.gov.za/documents/provincial%20budget/default.aspx>. To illustrate, the WC value of 0.3% for 2014/15 is the degree to which the 2014/15 'revised estimate' compensation of employees value appearing in the 2015 EPRE exceeds the 2014/15 'audited' compensation of employees value appearing in the 2016 EPRE. 'Average' is the average across the three other columns.

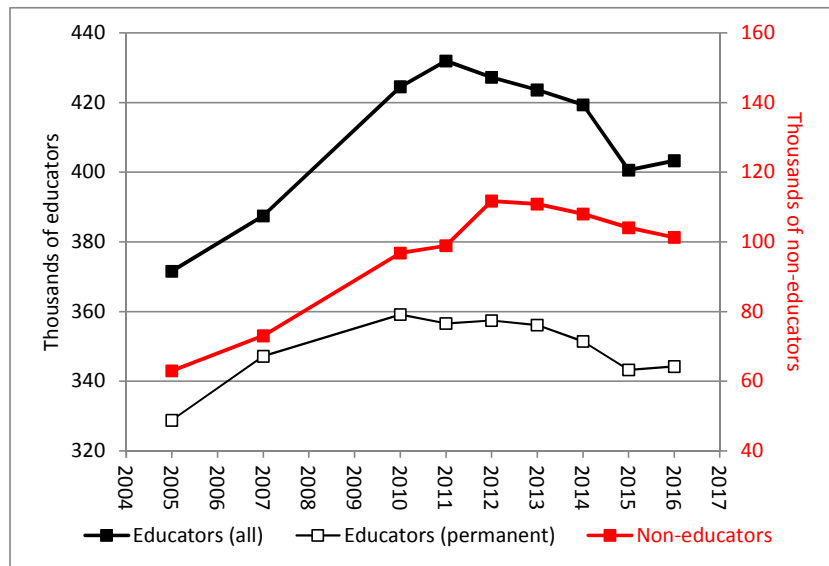
#### 4 Declines in employee numbers with enrolment growth

Figure 15 points to declines between 2012 and 2016 in employee numbers in the provincial education departments with respect to three key employee categories: permanently employed educators<sup>10</sup>; any educator receiving any payment; any non-educator receiving any payment. Amongst educators, a peak in the 2010 to 2011 period was followed by a headcount decline up to 2015. The trend between 2015 and 2016 was roughly flat. The 2010 to 2016 decline has been 4.1% for permanently employed educators and 5.0% for all educators. These are obviously worrying in the context of enrolment growth (discussed below) and rising levels of graduation amongst new teachers<sup>11</sup>. If newly graduated teachers are unable to find work in the teaching profession, they are likely to be lost to other areas of the economy.

<sup>10</sup> Nature of appointment codes 25, 27, 29 and 31.

<sup>11</sup> Hofmeyr and Draper, 2015: 14.

**Figure 15: Employee numbers 2005 to 2016**



Source: Persal microdata.

Note: Here any employee with a payment over zero (so not zero or negative) was counted. This explains why 2012 values seen in this graph are slightly higher than corresponding figures seen in Table 4. The important thing in terms of the current graph is that the same approach has been used for each year. Each point in the graph represents the situation in either October or November, so at a point in the year when educator numbers within the school year have reached a relatively stable point.

Do survey data collected from schools agree with the trend seen in the above graph? Figure 16 indicates that the answer is yes. Whilst the Snap Survey data of the DBE points to a peak in 2012 (not 2010 or 2011), the sharp decline in educator numbers between 2014 and 2015 is clearly visible. The 2014 to 2015 decline amounts to a 2.8% drop in the Snap data<sup>12</sup>. The 2012 to 2016 decline is 3.2%, compared to a 5.6% decline for this period using ‘Educators (all)’ in Figure 15<sup>13</sup>.

Enrolment trends are also seen in Figure 16. From 2012 enrolment increases have occurred, driven largely by an increase in births of over 10% between 2003 and 2005, and the continuation of high birth numbers up to 2008, after which births appeared to have dropped, though not back to their pre-2003 levels<sup>14</sup>. What is noteworthy and worrying is that over the last five or years declines in educator numbers were occurring concurrently with increases in learner numbers. The only earlier year illustrated in Figure 16 when this happened was 2003. The recent trend clearly implies a consistent rise in the learner-educator ratio. This is discussed in section 7 below. In fact, Figure 16 under-represents somewhat the problem of

<sup>12</sup> The size of the 2.8% decline seemed to warrant some interrogation. The school-level microdata were used to see what the trend would be for schools which had data for both the years 2014 and 2015 to see whether missing teacher values could be playing a role. The result was 22,294 public schools which could be compared, and these yielded a decline of 2.3%. There thus appears to be a missing data factor, but even after this is controlled for a 2014 to 2015 decline which exceeds anything seen since at least 2001 emerges.

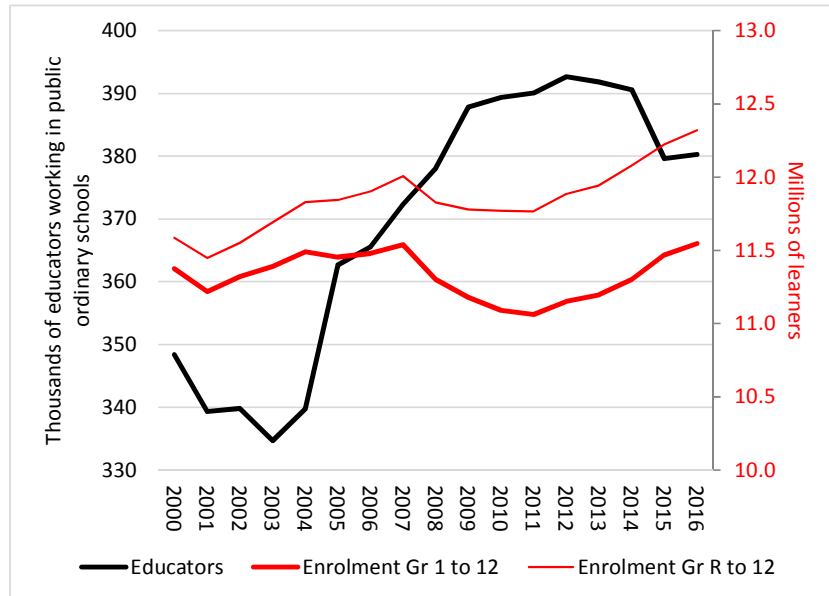
<sup>13</sup> Differences between the Snap and Persal figures would in part be due to their different points in the year: January versus October-November.

<sup>14</sup> The trend is clearly visible in the enrolment by age data of the schooling sector, as well as Home Affairs birth registrations data. These two sources display remarkable levels of agreement. The matter has been discussed with Stats SA. After 2013, Stats SA official mid-year population reports have increasingly come to reflect the 2003 to 2005 increase in births. An analytical report by the author is available on request.



public provisioning insofar as the number of educators employed privately, by the school governing body in public schools has grown steadily, by about 630 a year in the 2009 to 2015 period. To illustrate, the number of educators in the Snap data declined by 3.2% between 2012 and 2015 if one counts all educators in public ordinary schools, but the decline for just publicly employed educators is 4.2%.

**Figure 16: Educators and enrolments according to Snap Survey**



Source: Official DBE annual statistical releases.

Note: Red curves should be read against the right-hand axis. Learners and educators in public ordinary schools are reflected in the graph. In the case of educators, educators employed by the school governing body are included. Employees considered 'Practitioners' in the survey data, meaning generally Grade R teachers, are not counted in the graph.

Table 2 below provides province-level figures drawn from Persal microdata. In the 2012 to 2016 period all provinces have seen enrolment growth exceeding growth in educator numbers<sup>15</sup>, implying a rise in the learner-educator ratio. In three provinces, Eastern Cape, Gauteng, and Limpopo, the losses in non-educators were, in percentage terms, much larger than losses in educators.

<sup>15</sup> This is not true for KwaZulu-Natal if only permanent educators are considered, but is true for this province if all educators are considered.

**Table 2: Educator numbers by province 2012 and 2016 from Persal**

	2012-2016 enrolment change (%)	Educators (broad definition as for Table 3)			Educators (just permanent)			Non-educators		
		2012	2016	% change	2012	2016	% change	2012	2016	% change
EC	1.1	64,828	54,827	-15	59,776	53,372	-11	18,543	13,619	-27
FS	3.9	26,877	23,665	-12	22,630	19,978	-12	6,864	7,056	3
GP	10.2	65,032	68,487	5	53,933	57,367	6	22,392	20,596	-8
KN	0.0	100,490	97,960	-3	75,568	79,090	5	17,447	16,445	-6
LP	2.5	60,752	53,237	-12	54,475	49,749	-9	7,200	6,081	-16
MP	1.9	35,579	33,687	-5	30,828	29,376	-5	9,882	9,139	-8
NC	5.3	9,672	10,373	7	7,851	6,749	-14	2,920	2,882	-1
NW	6.6	27,930	26,417	-5	23,694	20,536	-13	4,620	4,246	-8
WC	7.3	32,396	32,311	0	28,628	28,006	-2	9,016	8,898	-1
SA	3.7	423,556	400,964	-5	357,383	344,223	-4	98,884	88,962	-10

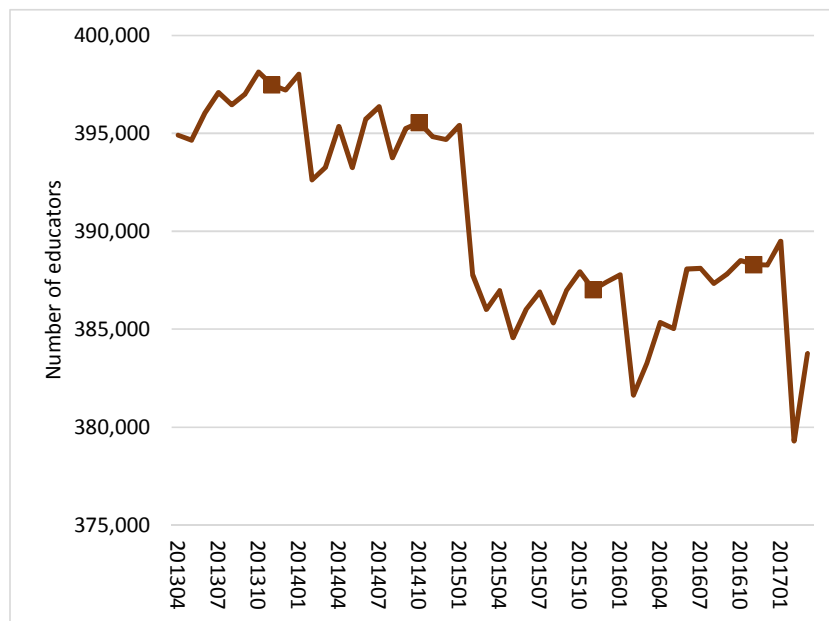
Note: Enrolment growth values refer to all learners in public ordinary schools.

## 5 Employee trends across months

Figure 17 below provides month-by-month educator totals extracted from the DBE's Business Intelligence. The system is not explicit about who is counted as an educator, but the levels seen in Figure 17 are between the levels for 'all' and 'permanent' educators seen in Figure 15. One can probably assume that the same criteria have been used across different months in the BI, so the BI figures seem useful for understanding exactly when the large educator declines discussed above occurred. Large declines were seen between January and February 2014, and even more so between January and February of 2015. This almost certainly reflects the termination of temporary educator contracts at the end of the school year. The fact that the decline is not seen between December and January could reflect the fact that payments occur in the next month. The decline between the 2013/14 educator count (the average across all twelve months of the financial year) and that of 2014/15 was 0.6% whilst the decline between 2014/15 and 2015/16 was 2.0%. These declines are roughly in line with the corresponding declines for permanent educators seen in Figure 15 and the educator trend seen in Figure 16. A similar month-by-month analysis appearing in a report emerging from National Treasury's Remuneration and Analysis Modelling (RAM) initiative<sup>16</sup> points to a decline in educator numbers of 4.0% between November 2013 and November 2015, against 2.6% if one uses values used for Figure 17. Treasury's analysis confirms that much of the recent decline happened between December 2014 and February 2015, meaning around the start of the 2015 school year.

<sup>16</sup> Pre-final report titled *Sector-specific remuneration analysis and modelling report: Basic education sector*, June 2016.

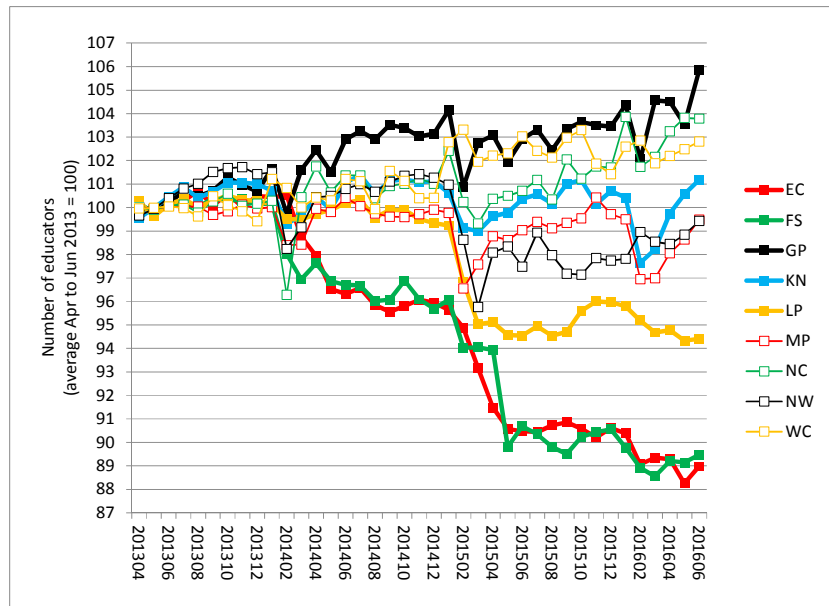
**Figure 17: Educator numbers by month 2013 to 2017**



Note: The four markers reflect levels during months used for Figure 15.

Figure 18 below breaks the national trend seen in the previous graph down by province, with the number of educators per province indexed so that the mean headcount over the first three months of the 2013/14 financial headcount becomes 100.

**Figure 18: Provincial educator headcount shifts by month 2013 to 2016**



## 6 Employee numbers, unit costs and movements across ranks

Table 3 below, which follows the format of a 2005 to 2012 comparison presented in the 2015 remuneration review, provides further details on the employment shifts at the national level. Over the three-year period 2012 to 2015 ‘manager educators’ (educators who are not level 1 teachers) experienced the largest headcount decline in percentage terms. Their decline was 15% (over three years), against around 3% for teachers. The manager educator headcount

decline within schools was 12% and a whole 37% outside schools. In absolute terms, the decline in manager educators was around 16,000 (around 11,000 in schools, 5,000 outside schools), against around 9,000 for teachers. Whilst the number of non-educators outside schools declined by 33%, it is noteworthy that non-educators *inside* schools *increased* by 3%. This increase is a rare exception to the general pattern of headcount declines.

What was the composition of the large reduction in schools-based manager educators of around 11,000 people, a trend which is likely to impact negatively on school management? A part of the 11,000 decline is probably not seriously detrimental for the schooling system. For instance, around 2,600 college lecturers appear in schools in 2012, probably because they had been re-deployed from colleges to schools, but by 2015 there were virtually none left in schools. However, just over 5,000 of the 11,000 decline are accounted for by a decline in the number of school principals, deputy principals and heads of department, all schools-based. This is clearly cause for concern and probably reflects freezes in promotions in the context of pressures to reduce costs, but also (as will be seen below) the logistical challenge of responding to a rising number of pre-retirement departures from these management posts. Details by rank and province appear in Table 5 below (and are discussed further down).

Turning to expenditure, the annual increase in personnel spending between the two months November 2012 and November 2015 was 5.0%. This percentage is calculated from the bottom row values in Table 4. How different would the 2015 spending totals have been if the 2012 headcounts had been sustained through to 2015? If the total number of schools-based educators had been kept constant, but the number of 'manager educators' had been allowed to decline as seen in Table 3, and declines outside of schools had been permitted, personnel spending in 2015 would have been roughly R6.1bn higher than the R155bn seen in the table. If in addition, the number of schools-based manager educators had been kept at 2012 levels, spending in 2015 would have risen by an additional R1.8bn. If all employee numbers, inside and outside schools, had been kept at 2012 levels, and 2015 unit costs had applied, then overall spending personnel would have been R165bn, compared to the R155bn seen in Table 3, so R10bn higher. These estimates are informative, yet rough, considering that they do not take into consideration how factors such as age might have changed 2015 average unit costs, had more people stayed in the system.

**Table 3: Headcounts 2012, 2015 and 2016 in Persal**

	2012 employees			2015 employees			2016 employees	
	All	%	Schools	All	%	Schools	All	%
Educators	423,557	81	406,638	398,922	81	386,463	400,964	82
Teachers	319,908	61	317,709	311,226	64	308,034	314,113	64
Temp. teachers	60,326	12	58,504	55,553	11	52,417	55,726	11
Manager educators	103,649	20	88,929	87,696	18	78,429	86,851	18
Non-educators	98,883	19	68,254	91,028	19	70,372	88,962	18
Total	522,440	100	474,892	489,950	100	456,835	489,926	100

Source: Persal payroll data for the provincial education departments. For all three years data from November were used.

Note: The current table and the next one use the same data sources and assumptions. Any employee with payments multiplied by twelve months coming to at least R20,600 in 2012, or R25,118 in 2015, or R27,207 in 2016 was considered (the median cost of an educator was 1.22 times as high in 2015 as in 2012, and 1.32 times as high in 2016 as in 2012). This was to exclude individuals such as substitute teachers receiving extremely small payments, or employees paying the employer. The unique Persal number was used to identify individual employees. The number of Persal components identified as schools in the 2012 data was 26,704. This would include a few independent schools, public schools using more than one component number, and pre-schools, where according to the payroll data publicly paid staff were employed. The number of Persal components considered schools in 2015 was 25,258. The difference between the 2012 and 2015 component counts would be partly that certain components were not counted as schools in 2015 when they should have been, and partly that component numbers would have been rationalised between 2012 and 2015. The fact that the percentage of 'Teachers' in schools moved very little, from 99.3% to 99.0% between 2012 and 2015, according to the table, suggests that the rationalisation of component numbers would have been the largest reason for the decline in the number of components considered schools.

**Table 4: Unit costs and total costs 2012, 2015 and 2016 in Persal**

	Average annualised cost					Total cost (Rm over 12 months)				
	2012	Ratio 2012	2015	2016	Ratio 2016	2012	Ratio 2012	2015	2016	Ratio 2016
Educators	282,063	110	346,786	374,568	110	119,469	89	138,341	150,188	90
Teachers	252,630	99	310,879	337,588	99	80,819	61	96,754	106,041	63
Temp. teachers	177,226	69	240,709	262,287	77	10,691	8	13,372	14,616	9
Manager educators	372,909	146	474,219	508,314	149	38,651	29	41,587	44,148	26
Non-educators	142,658	56	179,510	191,140	56	14,107	11	16,340	17,004	10
90 <sup>th</sup> percentile	223,157	87	288,815	298,688	88					
Total	255,677	100	315,708	341,261	100	133,576	100	154,681	167,192	100

Note: Figures here relate only to the employees reflected in the previous table. Thus employees with low payments, such as substitute teachers, would not be included.

**Table 5: 2012 to 2015 declines in 'manager educators' in schools**

	2012 headcounts			2015 headcounts			2012-2015 change				2012-2015 % change			
	HoD	Deputy	Principal	HoD	Deputy	Principal	HoD	Deputy	Principal	All	HoD	Deputy	Principal	All
EC	5,886	1,354	5,243	5,489	1,343	5,106	-397	-11	-137	-545	-6.7	-0.8	-2.6	-4.4
FS	2,685	852	1,224	2,483	791	960	-202	-61	-264	-527	-7.5	-7.2	-21.6	-11.1
GP	8,672	2,564	2,156	8,581	2,596	2,080	-91	32	-76	-135	-1.0	1.2	-3.5	-1.0
KN	11,286	2,642	5,581	10,497	2,421	5,243	-789	-221	-338	-1,348	-7.0	-8.4	-6.1	-6.9
LP	6,091	1,563	3,509	5,163	1,245	3,309	-928	-318	-200	-1,446	-15.2	-20.3	-5.7	-13.0
MP	4,047	1,109	1,789	4,036	1,140	1,639	-11	31	-150	-130	-0.3	2.8	-8.4	-1.9
NC	1,035	298	581	807	303	496	-228	5	-85	-308	-22.0	1.7	-14.6	-16.1
NW	2,988	899	1,697	2,713	908	1,335	-275	9	-362	-628	-9.2	1.0	-21.3	-11.2
WC	4,086	1,333	1,534	3,972	1,331	1,469	-114	-2	-65	-181	-2.8	-0.2	-4.2	-2.6
SA	46,776	12,614	23,314	43,741	12,078	21,637	-3,035	-536	-1,677	-5,248	-6.5	-4.2	-7.2	-6.3

*Note: For the purposes of this table any person with the rank in question was counted, without using the low payment thresholds described in the note for the previous table. Not all schools-based 'manager educators', meaning educators who are not level 1 teachers, are counted in the current table. Other 'manager educators' not included here would include education specialists and therapists.*

**Table 6: 2015 to 2016 declines in 'manager educators' in schools**

	2016 headcounts			2015-2016 change				2015-2016 % change			
	HoD	Deputy	Principal	HoD	Deputy	Principal	All	HoD	Deputy	Principal	All
EC	5,447	1,297	4,964	-42	-46	-142	-230	-0.8	-3.4	-2.8	-1.9
FS	2,309	689	936	-174	-102	-24	-300	-7.0	-12.9	-2.5	-7.1
GP	8,826	2,647	2,069	245	51	-11	285	2.9	2.0	-0.5	2.1
KN	10,420	2,293	5,350	-77	-128	107	-98	-0.7	-5.3	2.0	-0.5
LP	4,809	1,146	2,996	-354	-99	-313	-766	-6.9	-8.0	-9.5	-7.9
MP	4,139	1,172	1,598	103	32	-41	94	2.6	2.8	-2.5	1.4
NC	986	318	490	179	15	-6	188	22.2	5.0	-1.2	11.7
NW	2,508	769	1,381	-205	-139	46	-298	-7.6	-15.3	3.4	-6.0
WC	3,947	1,327	1,439	-25	-4	-30	-59	-0.6	-0.3	-2.0	-0.9
SA	43,391	11,658	21,223	-350	-420	-414	-1,184	-0.8	-3.5	-1.9	-1.5

**Table 7: HoD gains and losses 2012-2016**

	Nov. 2012	2013 (Nov. 2012 to Nov. 2013)		2014 (Nov. 2013 to Oct. 2014)		2015 (Oct. 2014 to Nov 2015)		2016 (Nov. 2015 to Nov 2016)		Nov. 2016
	HoDs	Losses	Gains	Losses	Gains	Losses	Gains	Losses	Gains	HoDs
EC	5,886	665	594	692	390	1,029	1,080	613	525	5,476
FS	2,685	295	399	246	112	421	258	261	83	2,314
GP	8,715	699	542	1,072	1,187	1,391	1,303	1,058	1,312	8,839
KN	11,292	821	775	867	408	1,246	965	1,184	1,105	10,427
LP	6,091	606	601	379	21	591	27	373	32	4,823
MP	4,047	389	434	413	417	561	568	489	530	4,144
NC	1,035	118	109	71	3	162	11	117	296	986
NW	2,998	227	196	386	381	413	164	345	144	2,512
WC	4,087	315	319	361	307	540	476	444	422	3,951
SA	46,836	4,135	3,969	4,487	3,226	6,354	4,852	4,884	4,449	43,472

*Note: The values in this table are slightly higher than corresponding values in Table 5 because even fewer exclusions were applied in the current table. In particular, educators who had appointments in more than one rank within the month were counted, even if payments in terms of their head of department work was minor.*

What does Table 5 reveal regarding province-level trends in the declines in schools-based 'manager educators'? Overall, the declines have been largest, in percentage terms, in four provinces: Free State, Limpopo, Northern Cape and North West. But all nine provinces have seen declines. The least serious have been in Gauteng, Mpumalanga and Western Cape. In percentage terms, the declines have been worst for school principals and heads of departments. Deputy principal positions have fared the least badly.

If one considers Table 5 and Table 6 together, the overall 2012 to 2016 decline in schools-based managers has been 8%. It is noteworthy that Northern Cape succeeded in recovering many of its 2012 to 2015 losses through appointments in 2016.

The decline in the number of people in school principal positions, of 1,677 between 2012 and 2015, is not mainly due to a decline in the number of schools resulting from the closure of small schools. The number of public schools declined from 24,726 to 24,329 between 2012 and 2015<sup>17</sup>, meaning there was a decline of 377 schools. This means over this period the number of schools without a properly appointed school principal increased by around 1,300 (1,677 minus 377).

Table 7 focusses just on heads of department (HoDs), with a view to establishing when and how the overall number of people in this category declined. Clearly a large part of the trend has been an increase in the number of employees vacating head of department positions, from around 4,000 departures in 2013 to over 6,000 in 2015 (though the number declined to around 4,900 in 2016). Apart from cost concerns, there could have been difficulties in administering the filling of a much larger number of empty posts. In fact, the number of people appointed into head of department positions was considerably higher in 2015 and 2016 than in the previous two years. But appointments could not keep up with departures. Importantly, not all losses seen in Table 7 are departures from the system. Some represent movements within the system. For instance, of the 4,135 losses between November 2012 and November 2013, 2,078 people were not in the system in November 2013, meaning around half remained, but in positions other than head of department positions. Of the 2,078 not seen in the system in November 2013, only 256 had returned by November 2015. A large number of remainers, 1,649, became deputy principals. Of the 6,354 losses seen between 2014 and 2015, 3,594, so just over a half, would have been departures from the system.

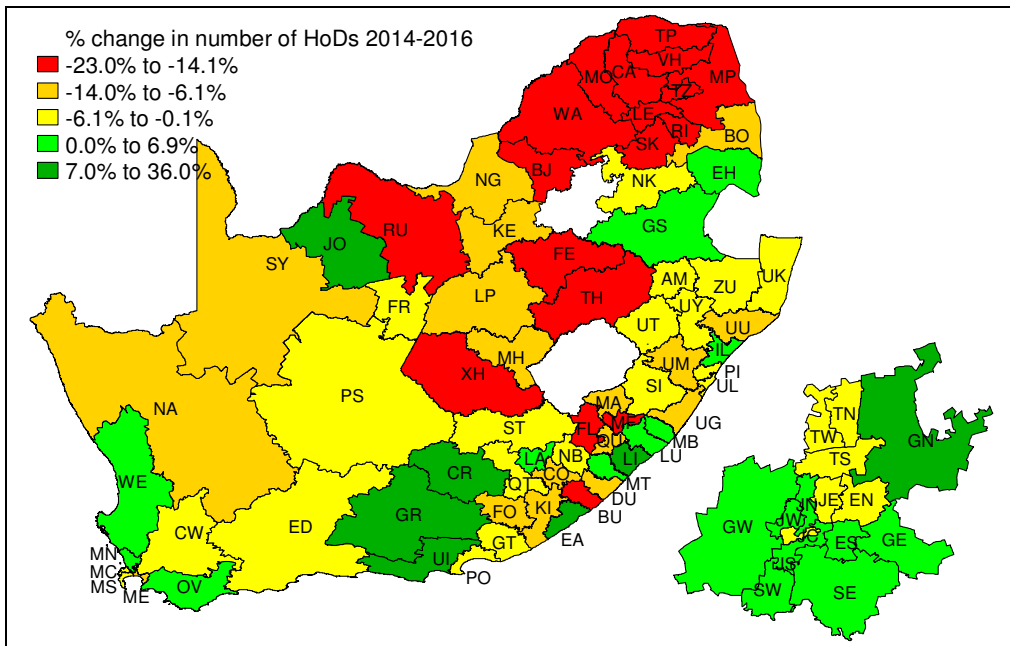
The overall decline in HoDs from 46,836 in November 2012 to 43,472 in November 2016 represents a 7% decline. Only Gauteng and Mpumalanga did not see a decline, and the worst declines were experienced by Limpopo (21%), North West (16%) and Free State (14%). In the case of Limpopo, the filling of vacated HoD posts was virtually halted from 2014. Figure 19 below breaks HoD declines down by district. What is particularly noticeable is how different the experiences of districts in Eastern Cape have been. The exact causes of this were not analysed, but two possibilities stand out. It is possible that Eastern Cape has redistributed HoD positions after a period of allowing discrepancies between enrolments and staffing to emerge. Alternatively, it may be that some districts are more successful than others at avoiding declines in HoD numbers, by getting vacated posts filled quickly (Eastern Cape as a whole saw 7% decline in HoDs). The second possibility implies worsening inequality, which would be avoidable through effective management of the system.

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<sup>17</sup> These figures, based on official DBE publications, include both public ordinary and public special schools.

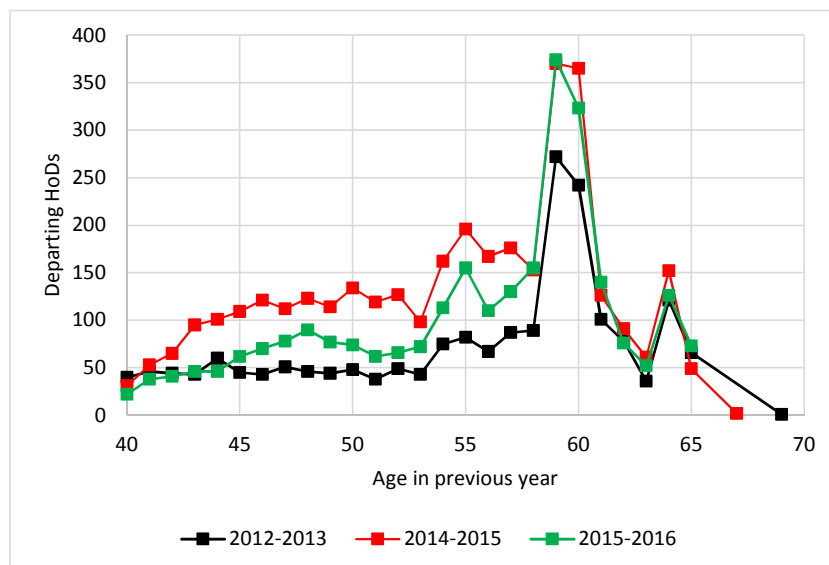


**Figure 19: 2014 to 2016 declines in HoDs by district**



Some of the increase in departures from the system, as in the increase from 2,078 to 3,594 in the number of departing HoDs, would be due to the fact that an increasing number of employees were reaching retirement age. However, as seen in the following graph, that is just a part of the phenomenon. What is very worrying is that much of the increase in the departures is due to people leaving well before retirement age. Between 2012 and 2013, of the 1,957 HoDs aged 40 and above departing from the system, 715 (or 37%), were below age 55. Between 2013 and 2014, of the 3,472 departing HoDs aged 40 and above, 1,564 (or 45%) were below age 55. Thus in both absolute terms and as a percentage of all leavers, younger leavers were becoming a larger phenomenon. A less serious situation was seen in the more recent movements between 2015 and 2016, when the number of HoDs aged 40 to 54 was 355, or 1% of all departing HoDs.

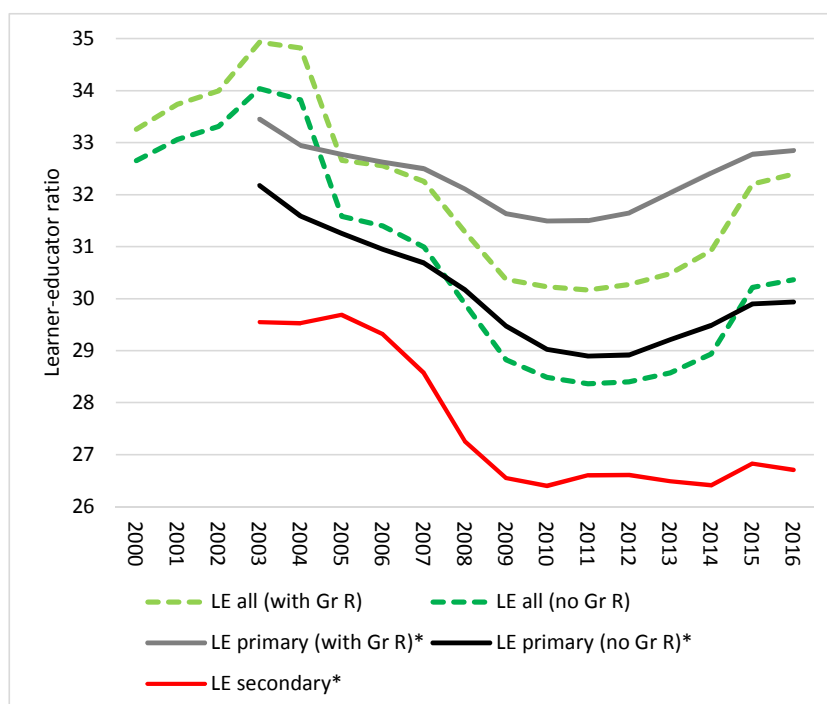
**Figure 20: Age of heads of department leaving the system**



## 7 Learner-educator ratios

Learner-educator (LE) ratios at the primary and secondary levels have increased in recent years, as one would expect from a situation where enrolment is increasing and educator numbers are decreasing. As seen in Figure 21 below, declines occurred in the ratio after 2003, with the lowest values being reached between 2010 and 2012. Thereafter the ratio climbed, though by 2016 it had not reached the levels seen in 2003. Between 2012 and 2016, the primary ratio rose by about 1.5 learners, whilst the secondary ratio rose by 1.3 learners between 2010 and 2016. Why are two primary level curves shown, one with and one without Grade R enrolments included? This is due to a problem in recent years in the count of 'Grade R practitioners'. There is a clear under-count of these people in some, but not all schools. Thus it was decided to count only people considered 'educators' within the learner-educator ratio. The problem here, however, is that in some schools Grade R teachers would be considered 'educators', though it is not clear which educators these would be. Dividing grades 1 to 12 learners by 'educators' is likely to result in an *under*-estimated ratio in schools where Grade R is offered, because educators teaching Grade R would be included in the denominator. On the other hand, dividing grades R to 12 learners by 'educators' is likely to produce a slightly *inflated* ratio as certain teachers (the 'practitioners') would be excluded from the denominator. The true ratio for the primary level would thus lie between the grey and black curves in Figure 21.

**Figure 21: Learner-educator ratios 2000 to 2016**

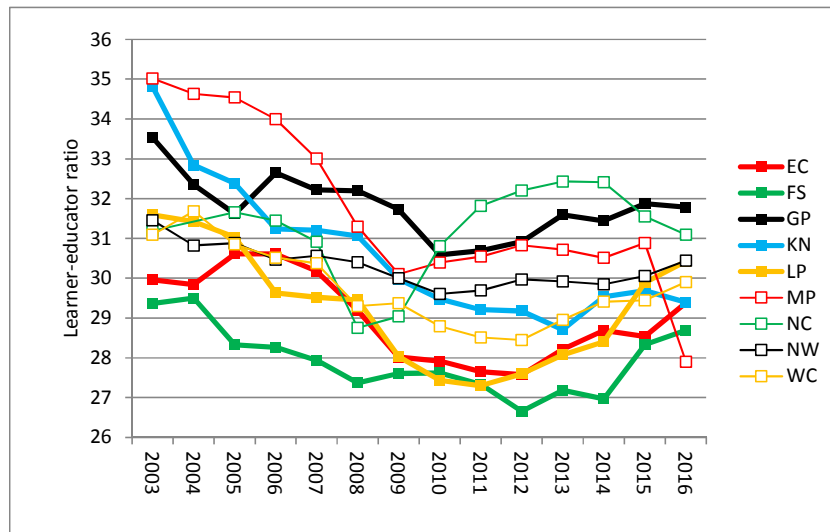


Source: For this and the following four graphs Snap Survey data (and no Persal data) were used. The 'all' values, where both primary and secondary are combined, draw from officially released aggregates (exactly the values used for Figure 16). Curves with an asterisk (\*) draw from school level Snap Survey data where only schools with adequate data were retained. Schools with suspiciously high or low educator values were thus removed. This was necessary in particular in the earlier years. Only schools with both learner and staff values were selected, and only schools with these data for all the 14 years (2003 to 2016). Moreover, any school where the band within which the LE ratio varied was wider than 16, was excluded. This led to a sub-sample of 9,140 schools, with provincial samples for eight provinces varying from 568 in MP to 1,875 in KN (figures include both the primary and secondary levels). The NC sample was problematically small, at just 34 schools. There seems to be no reason to believe sampled schools (other than in NC) would be significantly unrepresentative of all schools, at least as far as the LE ratio is concerned. A key reason why the educator count in the Snap Survey is so unreliable is that it is not used for any operational, and barely any monitoring purposes, meaning the incentives to improve the data are weak.

Note: 'Secondary' here includes schools where the highest grade offered is at least Grade 10 and the lowest grade is Grade 5 or above. All other schools would be considered 'Primary'. The qualifier 'no Gr R' means all grades other than Grade R were included. The denominator includes both publicly and privately paid educators, but only public ordinary schools are covered in this graph and the following four.

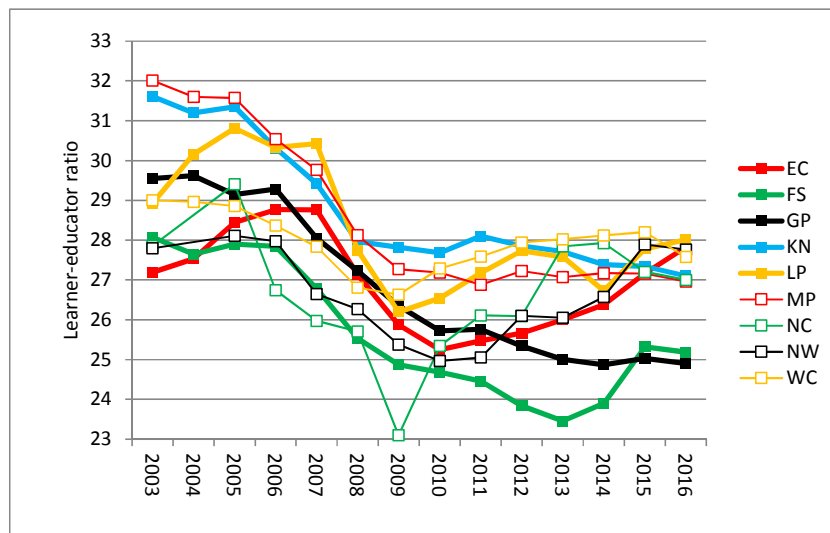
The next two graphs illustrate trends in provinces. At the primary level, the sharpest rise in the LE ratio has occurred in Limpopo. At the secondary level North West and Eastern Cape have seen particularly steep increases. This would in large part be due to better retention of learners, or less dropping out. Gauteng, which has an exceptionally high LE ratio at the primary level, but a rather low ratio at the secondary level, has seen its primary ratio worsen (rise) since 2010. Very importantly, the 'births wave' started in the 2003 to 2005 period will start affecting secondary schools, specifically Grade 8, in 2018. This is likely to exert further upward pressure on the LE ratios at the secondary level, apart from pressures brought about by better retention.

**Figure 22: Primary learner-educator ratios 2003 to 2016 by province**



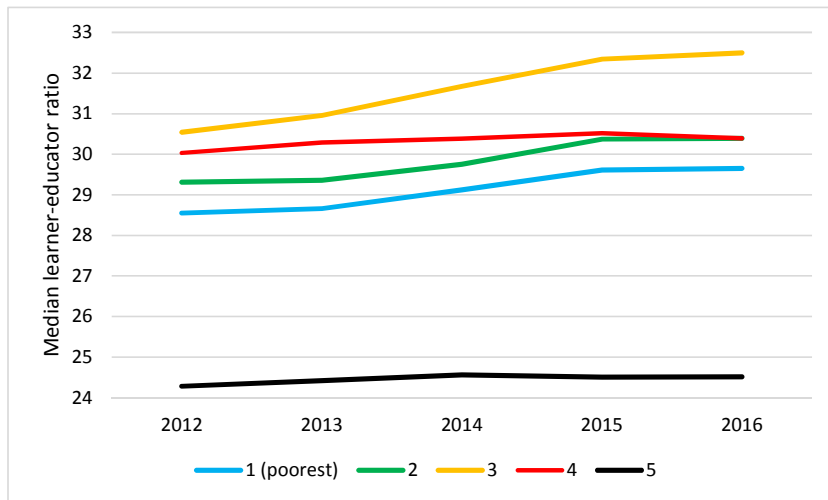
Note: The numerator here excludes Grade R learners. Data from the sub-sample of 9,140 schools referred to in the note to Figure 21 were used here and in the next graph. Sudden swings in values, such as the drop in the LE ratio for MP between 2015 and 2016 are likely to be the result of bad data, not actual trends.

**Figure 23: Secondary learner-educator ratios 2003 to 2016 by province**



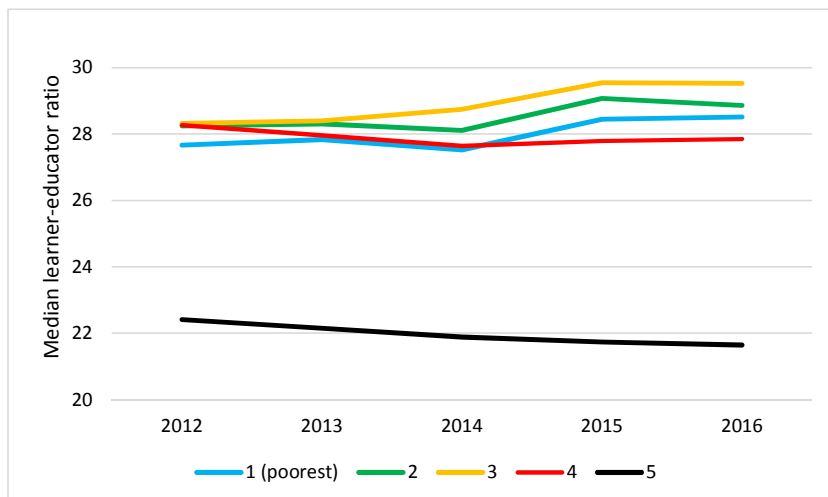
If the LE ratio trends are broken down by socio-economic quintile, it becomes clear that in certain respects, at both the primary and secondary levels, inequalities are worsening. At the primary level the LE ratio has been rising faster for quintiles 1, 2 and 3 schools than for quintiles 4 and 5 schools – see Figure 24 below. At the secondary level, increasing inequality was driven in part by a *lowering* of the LE ratio in quintile 5 schools.

**Figure 24: Primary level LE ratios by quintile**



Note: For this graph and the next one the approach of excluding Grade R enrolments was used. Data from 19,461 schools are used for the analysis, with filters along the lines of those used for the previous two graphs being used.

**Figure 25: Secondary level LE ratios by quintile**



## References

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## Appendix A: Workforce composition over time (from earlier 2015 review)

A trend analysis of three indicators over the last decade is provided below: number of employees, the average cost to the employer per employee, and total cost (the product of the previous two indicators). Figures are broken down by a few employee categories. At the highest level is the breakdown into the categories educators and non-educators. Educators are broken down into teachers and ‘manager educators’, where the latter are understood as any educator who is not a teacher. Teachers who are employed on a temporary basis are distinguished from teachers who are permanently employed. In each category, numbers of employees based in schools, as opposed to places such as colleges and offices, are indicated.

Table 8 below presents a series of statistics which indicate a number of things. There were considerable increases in the number of educators and non-educators (the *annual* increase works out to 1.9% and 6.8% respectively for the two categories). The increases for schools-based staff were very similar to those for the sector as a whole. In percentage terms, the annual increase for temporary teachers, at 5.3%, was many times larger than for permanent teachers (1.2%). In absolute terms, temporary teachers accounted for half of the increase for teachers (around 20,000 each for temporary and permanent for the whole seven-year period). The annual increase in the number of manager educators was only slightly higher than for teachers (2.0% against 1.9%). To sum up, the period 2005 to 2012 saw considerable increases in employee numbers, with educators accounting for most of the increase in absolute terms, though in percentage terms the increase for non-educators was three times what it was for educators. This would have changed the way education is delivered, or the ‘technology’, in the sense that the ratio of educators to non-educators moved from 5.9 to 4.3. For instance, this might result in educators worrying less about administration and cleaning in schools, and possibly cleaner schools, arguably a quality improvement. Of course this is conjecture, and changes in outcomes (even relatively superficial outcomes, such as the appearance of schools) are not guaranteed. Importantly, what did not appear to happen is bureaucratic ‘empire building’, at least insofar as there was not a major shift towards staff based outside schools. This is confirmed by the fact that total personnel spending on schools, as a percentage of personnel spending everywhere, remained roughly the same: 91.9% in 2005 against 91.3% in 2012.

In annual terms, the increase in the average unit cost of educators came to 10.9%, against 9.6% for non-educators. These increases are well above the 2005 to 2012 increases in the consumer price index, of 6.5% per year. Importantly, the sharp increase in the number of non-educators was largely about the entry of employees at lower salary levels. This largely explains why the ratio of the educator to non-educator unit cost moved from 1.82 to 1.98. Moreover, the high-end non-educator cost (at the 90<sup>th</sup> percentile) increased by 9.4% (in annual terms), against a figure of 9.6% for non-educators in general. There is therefore no strong indication of a ‘top-loading’ on the side of non-educators, in other words a large increase in better paid senior managers.

In terms of overall costs, there was a noteworthy shift towards non-educators, with the share of total expenditure of this category moving from 9% to 11%. The trend for manager educators was from 7% to 8% and for teachers from 62% to 61%, so there was a small shift towards better paid educators.

Overall, by far the most significant change in the 2005 to 2012 period appears to be the shift towards a higher proportion of non-educators in the workforce, from 14% to 19% of all employees.

**Table 8: Headcounts, unit costs and total costs 2005 and 2012**

	2005 employees			2012 employees			Average annualised cost				Total cost (Rm)			
	All	%	Schools	All	%	Schools	2005	Ratio	2012	Ratio	2005	Ratio	2012	Ratio
Educators	370,516	86	356,580	423,557	81	406,638	136,971	107	282,063	110	50,750	92	119,470	89
Teachers	280,565	65	277,652	319,908	61	317,709	122,439	96	252,631	99	34,352	62	80,819	61
Temp. teachers	42,033	10	41,331	60,326	12	58,504	89,123	70	177,228	69	3,746	7	10,691	8
Manager educators	89,951	21	78,928	103,649	20	88,929	182,301	142	372,905	146	16,398	30	38,651	29
Non-educators	62,289	14	42,799	98,883	19	68,254	75,262	59	142,656	56	4,688	8	14,106	11
90 <sup>th</sup> percentile							118,756	93	223,157	87				
Total	432,805	100	399,379	522,440	100	474,892	128,090	100	255,678	100	55,438	100	133,576	100

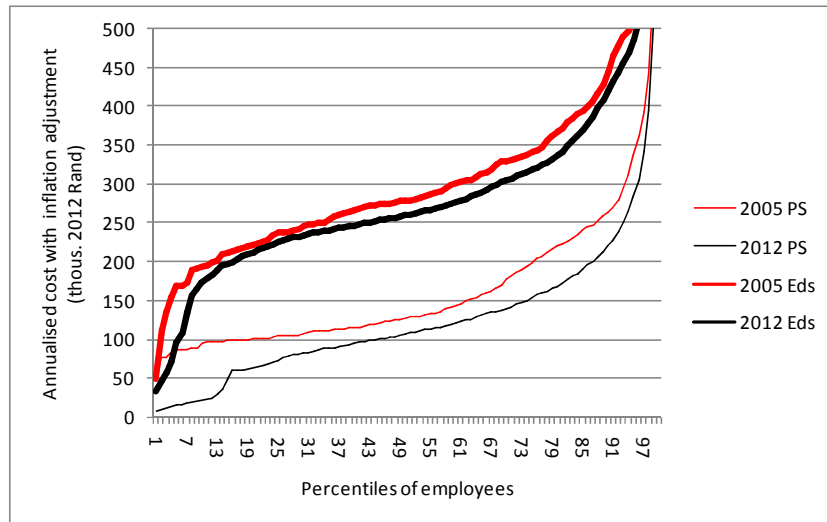
Source: Persal payroll data for the provincial education departments. The months are October 2005 and November 2012.

Note: Any employee with payments multiplied by twelve months coming to at least R10,000 in 2005, or R20,600 in 2012, were considered (the average cost of an educator was 2.06 times as high in 2012 as in 2005). This was to exclude individuals receiving extremely small payments, or paying the employer. The unique Persal number was used to identify individual employees.



The next graph illustrates the distribution of annual per employee costs. 2005 values were inflated by a factor of 2.06, the average unit cost for educators in 2012 divided by the figure for 2005. This was done to make absolute values more comparable. It is clear that there are individuals who received relatively low levels of payment (see the dips at the left-hand ends of the curves). These would be, for instance, part-time employees.

**Figure 26: Distribution of average annualised costs**



The following table indicates the non-educator ranks where the greatest growth occurred between 2005 and 2012. This information confirms that much of the growth has occurred at ranks with relatively low salary levels.

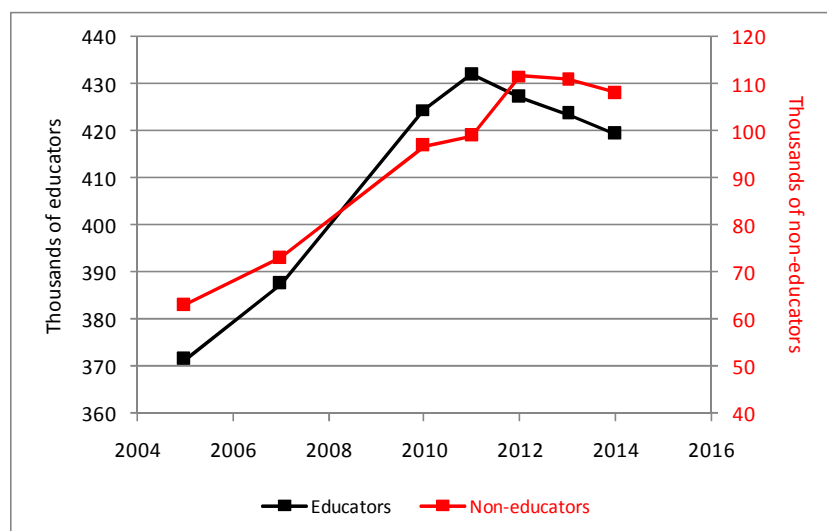
**Table 9: Non-educator ranks with large headcount growth 2005-2012**

Rank	2005	2012	Growth
MANAGEMENT AND GENERAL SUPPORT PERSONNEL SR1	1,537	15,296	13,759
MANAGEMENT AND GENERAL SUPPORT PERSONNEL SR3	1,702	7,835	6,133
ADMINISTRATIVE LINE FUNCTION & SUPPORT PERS SR5	1,457	7,109	5,652
ADMINISTRATIVE LINE FUNCTION & SUPPORT PERS SR4	3,740	7,521	3,781
ADMINISTRATIVE LINE FUNCTION & SUPPORT PERS SR2	5,855	8,702	2,847
ADMINISTRATIVE LINE FUNCTION & SUPPORT PERS SR3	3,687	5,642	1,955
HEALTH ASSOCIAT SCIENCES AND SUPPORT PERSON SR3	664	2,402	1,738
HEALTH ASSOCIAT SCIENCES AND SUPPORT PERSON SR1	598	1,980	1,382
MANAGEMENT AND GENERAL SUPPORT PERSONNEL SR5	814	1,904	1,090
AGRICULTURAL RELATED AND SUPPORT PERSONNEL SR3	650	1,697	1,047
MANAGEMENT AND GENERAL SUPPORT PERSONNEL SR6	2,096	2,762	666
ADMINISTRATIVE LINE FUNCTION & SUPPORT PERS SR8	476	1,070	594
MANAGEMENT AND GENERAL SUPPORT PERSONNEL SR8	902	1,423	521
MANAGEMENT AND GENERAL SUPPORT PERSONNEL SR10	160	493	333
ADMINISTRATIVE LINE FUNCTION & SUPPORT PERS SR7	964	1,282	318
MANAGEMENT AND GENERAL SUPPORT PERSONNEL SR7	1,402	1,639	237
HUMAN RESOURCE AND SUPPORT PERSONNEL SR5	20	251	231
AGRICULTURAL RELATED AND SUPPORT PERSONNEL SR1	1,178	1,393	215
MANAGEMENT AND GENERAL SUPPORT PERSONNEL SR12	102	297	195
HUMAN RESOURCE AND SUPPORT PERSONNEL SR8	22	212	190
HUMAN RESOURCE AND SUPPORT PERSONNEL SR7	17	199	182
ARTISAN AND SUPPORT PERSONNEL SR3	56	216	160
AGRICULTURAL RELATED AND SUPPORT PERSONNEL SR5	3	146	143
ADMINISTRATIVE LINE FUNCTION & SUPPORT PERS SR9	105	212	107
<b>Total</b>	<b>28,207</b>	<b>71,683</b>	<b>43,476</b>

Note: Rank codes change from time to time, and some did change between 2005 and 2012, especially for educators. This table may thus exclude categories with high growth but where the rank code changed. Matching across the two years occurred using the rank code.

Figure 27 below indicates the employee count trend for 2005 to 2014 using Persal data from several years, always around October. It is clear that there was a steady growth in the numbers up to a peak in 2011-2012, after which a slow decline began. The decline has been brought about by pressure on provincial education departments to restrict what was considered ballooning personnel spending.

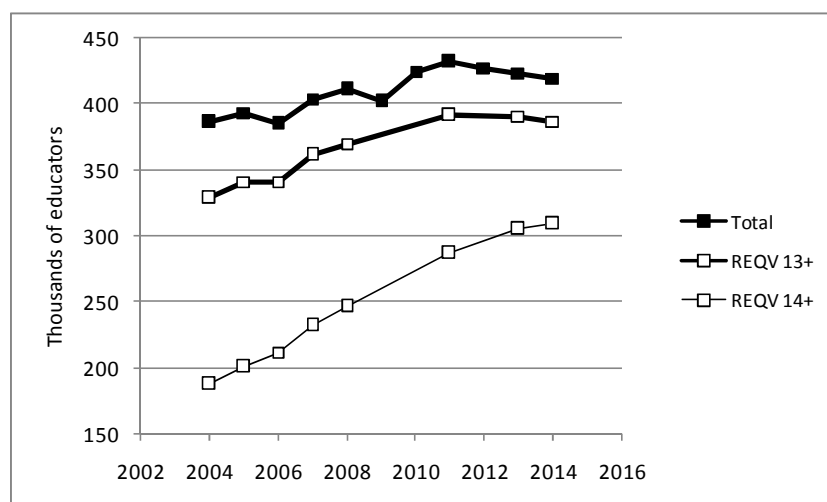
**Figure 27: Employee numbers 2005 to 2014**



Note: Here any employee with a payment over zero (so not zero or negative) was counted. This explains why 2005 and 2012 values seen in this graph are slightly higher than corresponding figures seen in Table 8. The important thing in terms of the current graph is that the same approach has been used for each year.

The next graph illustrates the number of educators by REQV<sup>18</sup>. The general pattern of large increases up to around 2011 is seen for educators with at least a minimum REQV 13 level. Though there has been extensive hiring of under-qualified educators<sup>19</sup>, the trend for educators seen in the previous graph appears to be not unduly influenced by movements of under-qualified educators.

**Figure 28: Educator numbers 2004 to 2014 by qualification level**



Source: Persal figures from the analysis undertaken for Department of Basic Education (2015c).

Finally, Table 10 below provides a few province-level versions of the figures from Table 8. The trends with respect to employee numbers are difficult to interpret because of changes to provincial boundaries implemented shortly after 2005. Provinces with '-' lost schools to another province, whilst those with '+' gained schools. One thing is clear, however, and this is that the ratio of educators to non-educators dropped markedly across eight provinces (all except NC). The trend was for provinces with high initial ratios to reduce the ratio most.

**Table 10: Headcounts and unit costs by province**

	Educators			Non-educators			Ratio eds to non-eds		Average annualised cost 2012	
	2005	2012	% change	2005	2012	% change	2005	2012	Educators	Non-educators
EC-	63,577	64,827	2	8,246	18,543	125	7.7	3.5	300,868	149,431
FS	24,068	26,877	12	5,654	6,864	21	4.3	3.9	269,515	143,593
GP+	48,029	65,032	35	14,497	22,392	54	3.3	2.9	283,183	142,426
KN+	78,891	100,489	27	9,255	17,447	89	8.5	5.8	259,952	133,938
LP+	59,362	60,752	2	5,048	7,200	43	11.8	8.4	288,068	157,459
MP+	27,419	35,581	30	4,830	9,881	105	5.7	3.6	286,509	122,337
NC+	7,161	9,673	35	2,440	2,920	20	2.9	3.3	288,248	161,917
NW-	32,061	27,930	-13	4,402	4,620	5	7.3	6.0	288,885	155,565
WC	29,948	32,396	8	7,917	9,016	14	3.8	3.6	297,314	143,049
SA	370,516	423,557	14	62,289	98,883	59	5.9	4.3	282,063	142,656

<sup>18</sup> Relative Education Qualification Value.

<sup>19</sup> Department of Basic Education, 2015c.