

Per learner spending inequities in 2016

1 February 2018

EXECUTIVE SUMMARY

Section 1 refers to a Unesco report which acknowledges what many have observed, namely that **the public funding of the schooling system in South Africa appears highly equitable** by international standards. This stands in stark contrast to inequalities in other areas, from learning outcomes, to household income and to individual wealth. Understandably, concerns are often raised around whether the public funding of schooling is sufficiently equitable and pro-poor. The current report aims to inform these debates by providing critical statistics, mainly on the public funding of public schools, but also on the extent to which public schools are financed privately, through in particular school fees.

Section 2 examines the **reliability of the data on the categorisation of schools into poverty quintiles**. Complaints in this regard are to some extent justified as different publicly available datasets provide different information. Maps illustrating the distribution of the poverty quintiles across the country are provided, using what can be considered a relatively reliable data source.

Section 3 examines learner-educator (LE) ratios, a critical element of school funding. One would expect schools in poorer quintiles to have lower (more favourable) LE ratios for two reasons: the post provisioning norms are in general pro-poor and moreover favour smaller schools, which are concentrated in less advantaged parts of the country. Thus the fact that **three provinces display a pro-rich distribution of the LE ratio** should be cause for concern. The three provinces are: Eastern Cape, Gauteng, and North West. All this is in relation to grades 1 to 12 learners divided by the number of 'educators' (excluding 'practitioners'). If one brings in Grade R and practitioners, a similar picture emerges. Data problems in relation to the identification of practitioners are relatively serious. This is one of several reasons why most of the report focusses just on the situation in grades 1 to 12.

Section 4 looks at the average annual cost of publicly employed and schools-based educators. This **average cost is around 5% higher in the most advantaged schools**, relative to the least advantaged schools, whether one considers educators in general, or just teachers. This pattern is driven by a number of factors: advantaged schools tend to have older and better qualified educators, and as they are larger tend to qualify for a higher proportion of promotion posts, and a higher salary notch for the school principal.

Section 5 examines **publicly paid non-educators**, or support staff. 85% of learners are in schools which have such staff, **and the pattern is not pro-poor**: the figure ranges from 79% in quintile 1 to 93% in quintile 4. This inequality remains if one removes small schools from the calculation. Section 6 looks at the average cost of non-educators. Again, the pattern is not pro-poor: unit costs are higher in more advantaged schools. Gauteng stands out for its exceptionally low average cost, which is around two-thirds of that found in all the other provinces. This allows Gauteng to place more non-educators across virtually all schools in the province.

Section 7 provides details on one spending item not appearing in the payroll data but included in the report's overall calculation of per learner spending, namely the **pro-poor school allocation**. This section also discusses briefly non-payroll spending items which for various reasons are not considered in the report's final calculations, including Grade R (which comes to around R4,600 a year for each Grade R learner) and the nutrition programme (which

amounts to around R601 a year for each of the 78% of learners who benefit from the programme).

Section 8 brings the various figures together to provide overall per learner spending amounts, for just personnel (or items in the payroll), and for personnel plus the school allocation. **For just personnel**, the net outcome is a pro-poor pattern across the quintiles at the national level, but this is due mainly due to strongly pro-poor spending in Limpopo and Mpumalanga. The other **seven provinces all display a pro-rich pattern**. However, once the pro-poor school allocation is taken into account, all provinces except for Gauteng display a pro-poor spending pattern, and in the case of Gauteng the pattern is only weakly pro-rich. **If spending on nutrition were to be included, it is very likely that all provinces would display a clearly pro-poor pattern.**

Section 8.1 confirms that the **gap between per learner spending at the primary and secondary levels** is by far the greatest in Gauteng, at 30% in favour of secondary schools. This disparity has been noted previously.

Section 8.3 finds that inequality within each quintile in a province is higher than it should be, and that this is largely driven by LE ratio inequalities, inequalities which persist even if one removes small schools from the calculations. This **within-quintile inequality is three times higher than the inequality across the provincial average per learner spending** figures. Moreover, the within-quintile inequality is **worse for poorer quintiles**, and **worse for the primary level**. It seems very likely that the underlying problems are difficulties in recruiting teachers to disadvantaged areas and to primary schools, as well as the fact that provincial departments tend to prioritise secondary schools and schools in more advantaged areas when it comes to taking action to fill posts. The latter problem is likely to be driven in part by the greater capacity of these schools to lobby for the filling of their vacant posts, and accountability pressures relating to the Grade 12 examinations.

Section 8.4 looks at **across-district inequalities** and concludes that in Eastern Cape these are large. It appears that some districts are far less successful than others in dealing with the filling of posts. What is clear in a map of average spending per learner per district is how exceptionally low spending is in the urban areas of Gauteng and Western Cape. This is probably exemplary in an international context, given how many developing countries grapple with the problem of 'urban capture' in the distribution of public school funding. Put differently, **South Africa seems to have on the whole succeeded in giving rural areas the emphasis required**, at least as far as the distribution of public funds is concerned.

Finally, section 9 examines private resourcing in public schools, using data on privately paid educators (meaning educators paid by the school governing body) as a useful proxy for data on school fees, which are hard to come by. The data reveal patterns which should **guard against the notion that each quintile is relatively homogenous in terms of private resourcing**. Whilst in quintile 5, 10% of primary learners are in schools where 50% or more of educators are employed privately, 14% of secondary learners in this quintile are in schools where not one privately employed educator exists, implying that fees would be relatively low. What would surprise many is that **in each of quintiles 1 to 3, at the primary and secondary levels, around 25% of schools have privately paid educators**. This is surprising as these schools are officially no fee schools. Anecdotal evidence suggests that these educators are paid little, using either 'voluntary contributions' from parents or a part of the school allocation (which is intended for non-personnel items, not personnel). The **policy implications** of this are complex. If school principals and school governing bodies are taking steps to employ additional educators outside the regular channels, then the reasons for this should be properly understood. The phenomenon is not necessarily bad.

Of concern should be the fact that the **private employment of non-educator personnel** to compensate for gaps in the public provisioning system is **more common in schools serving poorer communities**.

Despite the rather equitable funding picture that emerges if one considers just public resources, considering private resourcing changes this picture completely. If one combines both public and private funding, one can say that the best funded 10% of the system is 64% better off in terms of funding than the worst funded 10%, or that **the best funded 20% of the system is 41% better funded than the worst funded 20% of the system**.

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1 Introduction¹

In a 2007 Unesco report, South Africa was described as a particularly equitable member of a set of 16 mostly developing countries, when it came to the public resourcing of schools. Specifically²:

Canada, Peru, South Africa and the United States show the smallest interregional disparities in expenditure per pupil for primary and secondary education. ... Overall, there is a strong correspondence between countries' rankings on regional disparities in expenditure per pupil and pupil-teacher ratios in primary and secondary education. Canada, Peru, South Africa and the United States are at or near the top of the rankings on both measures...

South Africa's international standing with regard to these indicators is likely to remain largely unchanged in 2017, and reflects the remarkable pro-equity reforms implemented after the first democratic elections in 1994, reforms which have been described by Crouch (2005) as 'the most profound education reforms attempted anywhere in the world'. In contrast with South Africa's excellent record with respect to equity in resourcing, are the large learner performance inequalities. The gap between South Africa's best and worst performers in, for instance, the TIMSS mathematics tests are large, though several other developing countries display similar gaps. What is arguably even more serious is that South Africa's whole test score distribution is close to the lowest of all TIMSS participants. Put differently, the average South African learner, and South Africa's most disadvantaged learners, perform particularly poorly. These patterns are seen whether one looks at Grade 4 or Grade 8 results³. This is despite the fact that South Africa's average public spending per learner is high by developing country standards⁴.

Though in the bigger picture spending equity is not the greatest challenge for the South African schooling system, this matter is often raised as a concern. It appears as if it is raised as a concern in part because there is not enough recent published data on spending inequalities, but also in part because South Africa allows richer parents to supplement funding in public schools, which creates large overall spending inequalities, even if public funding is relatively equal. Without good information on this topic, and in a context of large inequalities with respect to learning outcomes, but also school infrastructure and of course income and

¹ Report produced by Martin Gustafsson for the Department of Basic Education.

² Sherman and Poirier, 2007: v.

³ Mullis *et al*, 2016: Exhibit 1.1 and 1.2.

⁴ See figures derived from Unesco and reproduced in a report accompanying this one, *Personnel spending pressures: Hiring and promotion cuts with enrolment growth*.

wealth in society, it is perhaps not surprising that many would wonder whether a part of the problem is inequitable public spending. A key aim of the current report is to provide information relating to inequities in current per learner spending, across provinces, quintiles, levels of the system (primary and secondary) and individual schools.

The emphasis of the report is on *current* spending per learner, not *capital* spending. The latter works rather differently to current spending, and is thus best analysed separately. Capital spending rises and falls by school in line with fairly long-range infrastructure development plans. Current spending, on the other hand, remains fairly constant at the school level over time. Inequalities in one year's current spending have implications which are relatively easy to interpret.

One rather visible result of the insufficient focus on per learner spending in South Africa, is that South Africa is amongst those countries not distinguishing between primary- and secondary-level per learner funding in the Unesco statistical system⁵. Though the budget structure of the provincial education departments distinguishes between primary and secondary schooling, this distinction is considered not to be sufficiently accurate because distinctions between primary and secondary schools are difficult to make. In fact, almost a fifth of learners are in schools which include some learners at the primary level (up to Grade 7) and some learners at the secondary level (Grade 8 and above)⁶.

The basis for effective reporting on spending inequities is statistics on average spending per learner per school. Average spending per learner per province can and has been calculated without school-level statistics⁷, but without school-level statistics many important indicators relating to *within*-province differences cannot be computed. There seem to be two key reasons why the necessary statistics are so seldom calculated. One is a lack of capacity. Though information systems in the sector, in particular the Persal payroll system, now consider schools as cost centres, there is limited capacity to analyse large sets of microdata. Secondly, the fact that South Africa's 'post provisioning policy' focusses on the equitable distribution of *people* and not *personnel funding* across schools has meant that analysts have focussed on learner-staff ratios (though even here there has not been enough work), rather than total funding per learner. As will be seen in the current report, focussing on *funding* per learner reveals important patterns which should inform policy debates.

Section 2 discusses the school poverty quintiles. Sections 3 to 7 discuss the various steps of the analysis: learner-educator ratios; average annual educator cost; learner to non-educator ratios; average annual non-educator cost; spending outside the payroll system. Section 8 discusses how the various steps combine to produce overall current spending figures. Finally Section 9 discusses the separate, but important and related matter of *private* funding in public schools.

2 The school poverty quintiles

This section explains patterns relating to the placement of schools and their learners in the five official poverty quintiles.

How accurate are the quintile values seen in the publicly available data? Analysts and service providers often complain that quintile values are wrong in the national datasets, relative to what schools claim their quintile is. Of course schools could be wrong: they could be referring

⁵ To illustrate, Namibia, Mozambique, Ghana and Kenya have made this distinction in the past, whilst Botswana and Tanzania, like South Africa, have not.

⁶ Department of Basic Education, 2011: 20.

⁷ See for instance Wildeman and Hemmer-Vitti (2010).

to the quintile they believe they *should* be in, and have applied to be in, though there has been no official approval of this.

A comparison of two important data sources reveals that there are serious discrepancies. The one data source was the 2016 quarter 1 master list of ordinary schools obtained off the DBE website in September 2016. The other was the 2016 Snap Survey data made public by the DBE via the DataFirst portal run from the University of Cape Town. 23,525 public ordinary schools could be linked across the two data sources using the school's national 'EMIS number' (the official DBE statistical report indicates one should find 23,719 schools in 2016, though the gap could be due to school closures). Of the 23,525 schools, 23,465 schools had a valid quintile value in both sources. The worrying discrepancy is that only 94% of these schools had the same quintile in both sources. In 1,255 schools, the Snap quintile value was lower than the master list value, whilst in 120 schools the Snap value was higher than the master list value. 766 of the 1,255 schools with a lower value in Snap were in Mpumalanga. Gauteng and KwaZulu-Natal accounted for most of the remaining schools, though it should be noted that after Mpumalanga, Northern Cape displayed the highest percentage of schools with a switch to a lower value in Snap. One can safely assume that when schools request a change their quintile values, they would nearly always want to move to a lower quintile as this would be associated with better resourcing. This implies that the Snap quintile values are more reliable than the master list ones. That this is the case was confirmed by examining a few provincial reports.

The following four tables provide basic breakdowns by quintile, using the 2016 Snap data, with Grade R enrolments included in the calculations. Whilst many may think of the quintiles as roughly equal to each other, quintiles 4 and 5, which may charge school fees, come to just 15% of schools and 23% of learners (Table 1 and Table 2). This is far from the 40% that the term 'quintile' might suggest. In 2009, quintiles 4 and 5 learners accounted for 28% of learners⁸. The decline from 28% to 23% would be mostly due to the reclassification of schools. Nationally, just under two-thirds of learners are at the primary level (Table 3). This value varies only slightly across provinces and quintiles, though it seems noteworthy that Limpopo, with high levels of repetition at the secondary level, displays the lowest percentage of 60%. At the primary level, quintiles 1 and 2 schools are small, and fairly similarly sized (Table 4). Quintiles 4 and 5 schools are around three times as large, and are more likely to qualify for management posts, in particular head of department (HoD) and deputy principal posts, which in turn would push up the average employee cost. Interestingly, despite high levels of repetition, secondary schools in Limpopo are considerably smaller than such schools in other provinces. If one restricts the analysis to only schools with grades 8 to 12, the pattern of exceptionally small secondary schools in Limpopo remains.

Table 1: Distribution of schools across quintiles

	Q1	Q2	Q3	Q4	Q5	Unknown	Total	Total
EC	36	29	31	1	2	0.1	100	5,445
FS	52	16	18	6	8	0.3	100	1,210
GP	15	12	28	24	22	0.0	100	2,083
KN	34	30	21	8	8	0.3	100	5,876
LP	40	42	16	0	2	0.3	100	3,854
MP	53	32	8	3	4	0.2	100	1,717
NC	31	22	22	14	11	0.0	100	544
NW	36	21	33	8	1	0.4	100	1,458
WC	20	11	14	23	31	0.5	100	1,442
SA	35	28	22	7	8	0.2	100	23,629

⁸ Department of Basic Education, 2011: 21.

Table 2: Distribution of learners across quintiles (R to 12)

	Q1	Q2	Q3	Q4	Q5	Unknown	Total	Total
EC	33	20	40	3	4	0.0	100	1,895,633
FS	31	24	26	7	11	0.3	100	668,570
GP	16	14	24	24	22	0.0	100	2,037,882
KN	22	26	28	12	11	0.3	100	2,798,174
LP	35	40	22	1	3	0.3	100	1,701,618
MP	43	38	10	3	6	0.2	100	1,042,562
NC	23	23	24	17	12	0.0	100	286,734
NW	28	20	40	10	2	0.5	100	807,030
WC	10	13	17	27	33	0.3	100	1,058,302
SA	26	24	27	11	12	0.2	100	12,296,505

Table 3: Percentage of learners at the primary level (R to 7)

	Q1	Q2	Q3	Q4	Q5	Overall
EC	69	68	66	55	60	67
FS	65	70	64	74	57	66
GP	71	67	65	63	63	65
KN	66	62	62	59	61	63
LP	63	61	56	31	62	60
MP	64	65	56	62	66	63
NC	68	74	68	61	64	68
NW	73	66	66	50	60	66
WC	78	76	63	72	63	68
SA	67	65	63	63	62	64

Note: For this table, all schools were considered, even schools with learners at both the primary and secondary levels (in which case the percentage would cover just the primary learners).

Table 4: Median school size

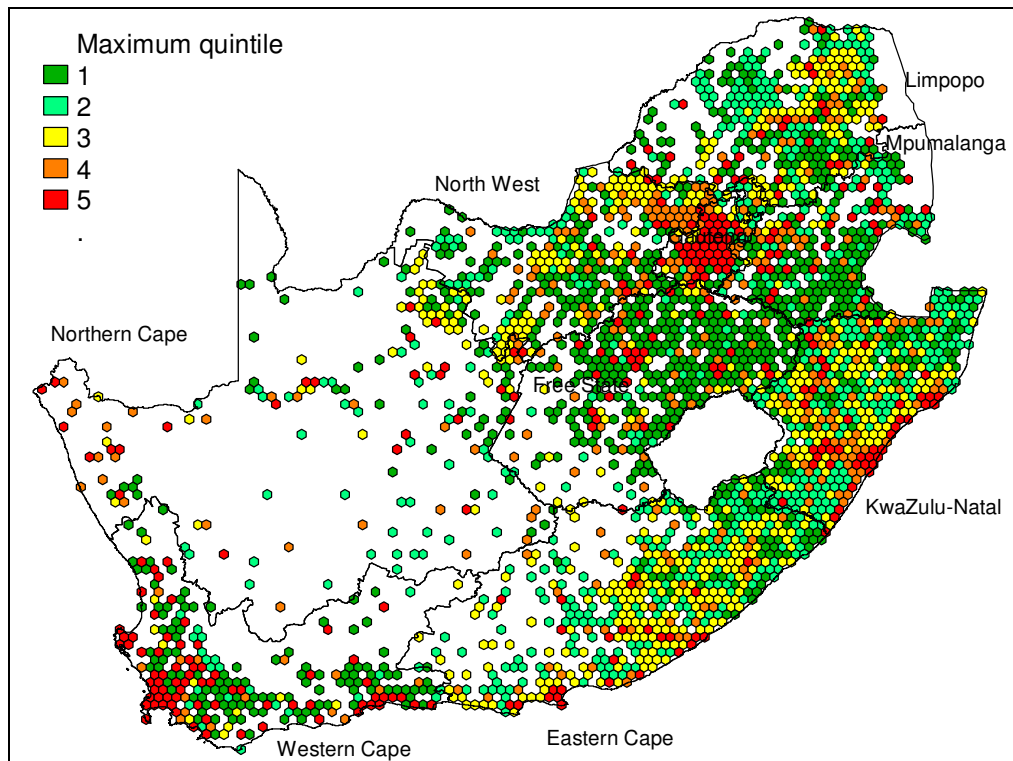
	Q1	Q2	Q3	Q4	Q5	Overall
Primary level (highest grade is Grade 7 or lower)						
EC	172	118	243	408	572	173
FS	31	962	866	574	810	296
GP	1,099	1,139	759	889	939	909
KN	215	282	496	637	637	314
LP	312	326	449	447	666	339
MP	375	671	683	401	829	478
NC	186	457	429	575	587	328
NW	293	424	566	604	724	440
WC	128	944	892	826	719	646
SA	229	284	477	741	753	342
Secondary level (lowest grade is Grade 8 or higher)						
EC	544	379	514	779	735	501
FS	627	677	919	738	727	731
GP	1,020	1,258	1,081	1,103	1,036	1,080
KN	361	440	776	930	834	536
LP	338	391	612	751	781	401
MP	547	771	774	775	766	669
NC	426	748	817	674	472	608
NW	402	552	655	829	932	590
WC	1,033	1,177	1,053	983	874	946
SA	430	478	748	956	872	587

Note: This table ignores schools with a mix of primary and secondary grades.

The three maps appearing below illustrate the distribution of quintiles across the country. The first map confirms that quintiles 4 to 5 schools are found across much of the country. The

second map confirms that quintile 1 schools are also widely distributed. Only cells which are not dark green contain no quintile 1 schools. There is one noteworthy exception to the pattern. Eastern Cape, outside ex-Transkei, largely excludes quintile 1 schools. The third map indicates which quintile is most represented by a simple count of schools. Where there was a tie, there was downward rounding to the lower quintile. Limpopo's pattern is interesting: the south of the province is more likely to have quintile 1 schools than the north of the province.

Figure 1: Maximum quintile within a small area



Note: Each cell represents an area containing at least one school. Each is around 18 kilometres across.

Figure 2: Minimum quintile within a small area

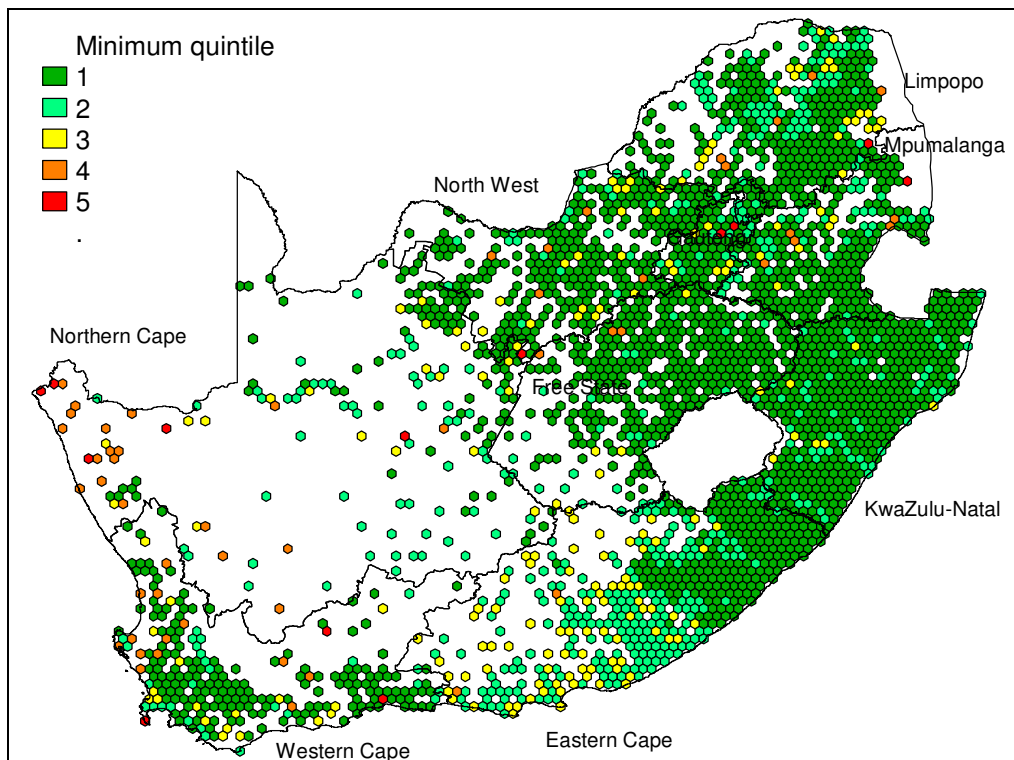
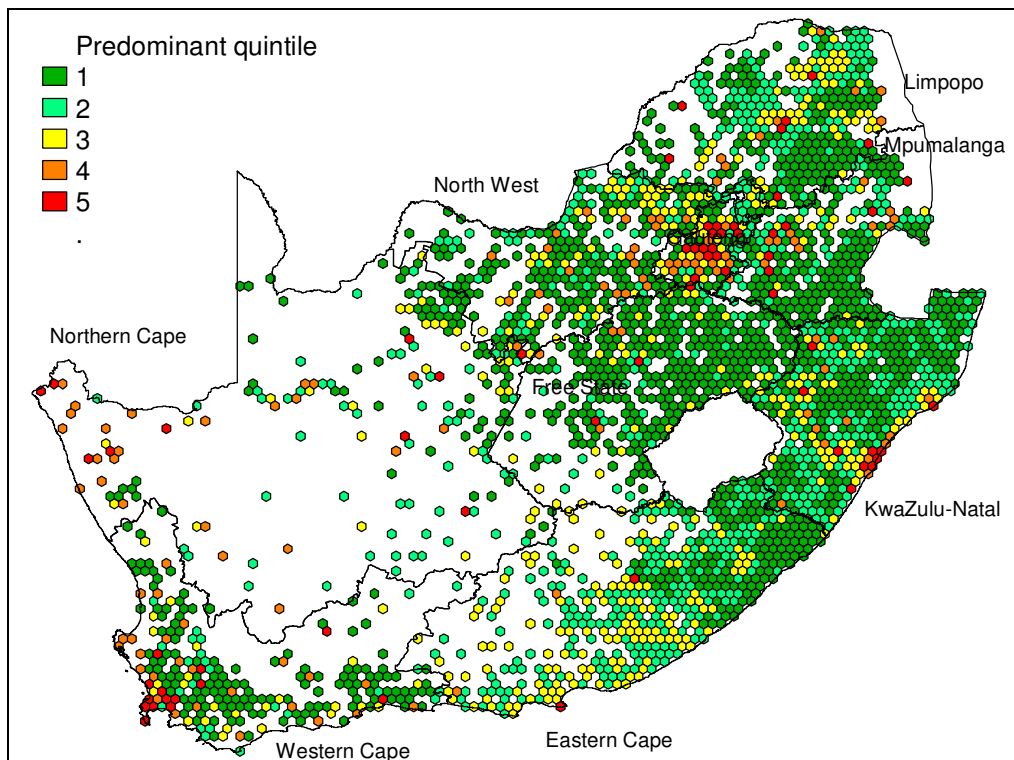


Figure 3: Predominant quintile within a small area



3 Learner-educator ratios

An obvious place to begin an examination of resourcing inequalities is the learner-educator (LE) ratio. For this, Snap Survey data for 2016 were used. A few data quality issues in relation to the Snap Survey are discussed at the end of the current section.

In Table 5, the numerator is learners in grades 1 to 12, whilst the denominator is publicly paid ‘educators’ (meaning ‘practitioners’ are excluded, as well as educators paid by the school governing body). This table indicates that LE ratios are more favourable in poorer schools. For instance, at the national level the LE ratio is 2.6 learners higher for quintile 5 schools (so less favourable) than for quintile 1 schools. If one includes the approximately 21,000 publicly paid Grade R practitioners, and uses grades R to 12 as one’s numerator, the gap between the rich and poor, in favour of the poor, is 1.8 (see Table 6). The post provisioning norms indicate that quintile 1 schools should ideally have 8% more educators than quintile 5 schools⁹, a difference that in fact corresponds fairly closely to actual differences in Table 5 (for instance the 33.1 for quintile 5 is 8.5% higher than 30.5 for quintile 1). Of course this comparison to the policy is rough, for instance because it does not take into account the fact that quintile 1 has more small schools (see Table 4), and smallness results in an even lower LE ratio within the norms.

Turning to differences across provinces, three provinces display the opposite to the national (and intended) pattern in Table 5. Eastern Cape, Gauteng and North West all display more favourable ratios in quintile 5 compared to quintile 1. If one takes practitioners into account, a fourth province, Northern Cape, joins this group. This is concerning. If one analyses the slope across all five quintiles in Table 6, Gauteng, Northern Cape and North West emerge as having slopes favouring the rich. There are many possible explanations for this. A likely one is that teachers prefer to work in better off schools whilst the provincial department does not do enough to prevent a situation in which unfilled posts are disproportionately concentrated in poorer schools.

Table 5: Learner-educator ratios (excluding Grade R practitioners) in 2016

	Breakdown by quintile (1 is poorest)					By level		Overall
	1	2	3	4	5	Primary	Sec.	
EC	33.2	30.0	33.7	34.8	31.8	32.7	32.0	33.5
FS	29.0	30.9	30.3	30.7	31.5	32.0	26.1	30.5
GP	35.0	34.1	33.2	33.6	33.6	37.4	28.9	33.8
KN	28.4	29.5	31.9	31.5	30.7	31.2	28.5	30.5
LP	30.2	30.6	32.5	32.1	35.1	32.4	29.4	31.1
MP	26.9	29.0	29.8	30.4	33.2	28.5	27.7	28.5
NC	31.3	31.3	33.1	31.3	32.1	33.6	30.4	32.3
NW	32.2	32.3	33.4	31.8	30.3	33.1	27.1	32.7
WC	33.2	35.9	35.2	35.7	35.5	36.7	32.5	35.4
SA	30.5	30.7	32.8	33.1	33.1	33.0	29.2	32.0

Note: Special care must always be taken when calculating statistics specific to primary or secondary schooling, because 17% of learners find themselves in school with a mix of primary grades (R to 7) and secondary grades (8 to 12). This percentage is highest in Eastern Cape, where it is 50%. The approach taken to arrive at the above primary-secondary breakdown was to assume that in ‘mixed schools’, staff were shared in proportion to enrolment across the grades. The same approach was employed in all other similar tables in this report. The numerator for the learner-educator ratios shown here is enrolment in grades 1 to 12, with Grade R excluded.

⁹ Derived from the specifications in section 5(a) of Government Notice 1451 of 2002.

Table 6: Learner-educator ratios (including Grade R practitioners) in 2016

	Breakdown by quintile (1 is poorest)					By level		Overall
	1	2	3	4	5	Primary	Sec.	
EC	33.7	29.5	33.5	36.0	33.2	31.8	31.5	32.7
FS	30.8	32.8	32.0	32.5	32.9	34.4	26.1	31.9
GP	31.7	31.2	29.9	30.8	31.4	32.1	28.7	30.9
KN	28.4	29.7	32.2	32.4	31.9	31.6	28.4	30.7
LP	32.3	32.6	34.4	31.8	36.9	35.8	29.3	33.0
MP	28.2	30.5	31.0	31.4	34.2	30.3	27.6	29.6
NC	29.2	29.1	32.1	29.0	29.0	30.8	28.2	29.8
NW	34.6	34.5	35.4	33.1	31.8	36.3	27.1	34.7
WC	33.7	36.8	35.5	36.1	36.6	37.4	32.4	36.0
SA	31.2	31.2	32.8	32.5	33.0	33.0	29.0	32.0

Note: The current table uses enrolment in grades R to 12 as the numerator.

The figures in the preceding tables which use Snap data are good enough for the purposes of the current analysis. Yet there are issues relating to the quality of the Snap Survey data which should be mentioned. The most serious issue relates to the counting of Grade R practitioners. Because of problems with the survey instrument, dating back to 2010, certain schools have under-reported the number of practitioners, depending on how the survey instrument was interpreted. This problem has been discussed in some depth in an earlier report¹⁰. For the 2016 data, missing practitioners were imputed in the manner used for the earlier report. Moreover, in the 2016 data the categories ‘Orientation and Mobility Staff’ and ‘Interpreters’ are clearly meant to mean what earlier datasets referred to as ‘Practitioners’.

A less serious data quality issue is the limited presence of strange values, or outlier values. Because of this problem, schools which reported having more than 200 educators were excluded from the analysis. Using medians (as in Table 4) also helps to circumvent the problem of outliers. Moreover, only schools with both educator and learner values were considered in any analysis. If the educator values were missing, for instance, the entire school was excluded from the analysis. The following table provides the total educator, practitioner and learner totals for 2016, after filtering out schools with missing educator values or more than 200 educators (there were no schools with missing learners after these two filters had been applied). ‘SR’ in the table refers to the Department of Basic Education’s (DBE) published *2016 School Realities report*. Clearly the totals from that report are very close to the totals derived from the Snap microdata used for the current analysis. This is reassuring. What stands out is the low number of practitioners in Free State and North West. It was assumed that these provinces counted teachers teaching Grade R largely as ‘educators’, a matter which is likely to skew certain statistics, such as the LE ratios in Table 5, for these two provinces.

¹⁰ Gustafsson, 2016: 40.

Table 7: Snap 2016 totals for public ordinary schools

	Schools	Learners grades R to 12	Publicly paid educators (A)	Publicly paid prac- titioners	Privately paid educators (B)	Privately paid prac- titioners	All educators (A + B)
EC	5,447	1,896,114	53,999	3,970	4,695	332	57,969
FS	1,200	670,486	20,993	3	1,737	8	20,996
GP	2,083	2,037,882	57,254	8,683	6,471	601	65,937
KN	5,474	2,636,462	81,082	4,851	5,428	308	85,933
LP	3,846	1,694,896	50,756	673	1,469	224	51,429
MP	1,659	992,713	32,965	553	1,451	43	33,518
NC	544	286,734	8,438	1,189	567	261	9,627
NW	1,462	809,228	23,295	6	1,692	16	23,301
WC	1,447	1,059,597	28,228	1,236	5,266	2336	29,464
SA	23,162	12,084,112	357,010	21,164	28,776	4,129	378,174
SR	23,719	12,342,213					380,284
SA/SR	0.977	0.979					0.994

Note: 'SR' refers to the School Realities publication for 2016.

Why were Persal payroll data not used to obtain the number of publicly paid employees per school, instead of the Snap data? This would have meant drawing from just one data source as far as publicly paid personnel are concerned. As explained below, the Persal data were used to obtain average employee costs, but not numbers of employees per school. The reason why the latter was not done is simply that the placement of employees in schools appears more accurate in the Snap data than in the Persal data. This one would expect, as there is no reason why the Snap data would place an educator in a different school to the one in which she works. On the other hand, in Persal there can be delays in the updating of the employee's school when an employee changes school. The operational consequences of such delays are not serious as most employees are paid through their personal bank accounts.

To what degree do the Persal data differ from the Snap data with respect to employees per school? The answer is to a large degree. A whole 24% schools, counting only schools with educators in both data sources, have figures which differ across the two sources by 5 educators, or 10% of educators. Some of this discrepancy would be due to actual movements of teachers between the start of 2016 (when the Snap Survey was run) and November 2016 (the month from which the Persal data comes). However, it is inconceivable that most of the discrepancy can be attributed to this fact. The fact that different provinces display very different values, where the national value is 24%, is telling. Different provinces have different capacities when it comes to updating the school in Persal timeously. The provincial values appear in Table 8 below. Western Cape is clearly best when it comes to this updating task.

Table 8: Percentage of schools with large Persal-Snap discrepancies

Percentage of schools with counts of educators in both datasets, where the one value differs from the other by more than 5 or more than 10%	
EC	34
FS	17
GP	18
KN	25
LP	18
MP	40
NC	18
NW	16
WC	5
SA	24

A further, but much less important, reason for not using Persal as the sole source for calculating LE ratios is that even with considerable analysis, it is not easy to identify all the country's public ordinary schools amongst the approximately 31,000 components registered on Persal (this is considering just Persal from the nine provincial education departments). The total number of schools with educator data on both Snap and Persal, which could be linked across both data sources, was 22,955 (this can be compared to the official number of schools, 23,719, seen in Table 7).

4 Average annual educator cost

The average annual cost of an educator was found using Persal payroll data. A Persal download for November 2016, covering all the nine provincial education departments, was used. November represents a relatively good month as vacancies are likely to be low, as vacancies created in earlier months are relatively likely to have been filled. Moreover, November is before the release of a large numbers of temporary employees, who often see their employment come to an end in December or January. November is thus likely to display a relatively large workforce, and one reflective of what the ideal is, at least within prevailing budgets.

The following exclusions and categorisations were applied in order to arrive at a 'clean' dataset that was then used for the analysis that follows.

- Employees whose component number could not be matched with the EMIS¹¹ identifier of a public ordinary school were excluded. Thus employees not working in these schools were excluded, but also a few employees who do work in these schools, but whose component number could not be matched to the EMIS identifier. The linking of the Persal component number and the EMIS identifier is facilitated by link tables, but these are incomplete. As far as possible other approaches, such as analysis of school names, were employed. It is estimated that only around 3% of employees who should have been linked were not linked due to component-EMIS linking problems.
- Any employee with a rank code on Persal in the range of 60000 to 69999 was considered an educator. What this means is that what are commonly referred to as 'Grade R practitioners' would not be counted as educators. Some provinces pay their practitioners through Persal. An attempt to identify these individuals in Persal was abandoned given the difficulty of determining what codes to use, and the fact that different provinces apply different coding practices. Practitioners paid through Persal would thus be within the group of 'non-educators' in the analysis that follows. Reliable and recent figures on what percentage of practitioners are paid through Persal, as opposed to via grants to schools, were not easily available.

In Table 9 below the average annual spending per educator is shown. Spending here is monthly spending in November per educator of any kind reflected on Persal, multiplied by twelve months. This data would include all benefits, including the employer's contribution to the pension fund.

Clearly, the pro-poor patterns seen in Table 5 contrast with the pro-rich patterns in seen in Table 9, patterns which are found in all nine provinces. Each educator in a less poor school costs the state more. Specifically, quintile 5 educators each cost 5% more than their colleagues in quintile 1 schools. Some of this difference would be driven by the fact that 'richer' schools tend to have older and more qualified teachers. It would also partly be driven by the fact that richer schools tend to be larger, and thus have school principals at a higher pay notch and are more likely to have at least one head of department and one deputy principal.

¹¹ Education Management Information System.

Yet it is worth noting that if one considers only level 1 teachers, the patterns remain. For instance the average cost of a teacher in quintile 5 is 6% higher than in quintile 1.

Table 9: Average annual educator cost in 2016

	Breakdown by quintile (1 is poorest)					By level		Overall
	1	2	3	4	5	Primary	Sec.	
EC	386,425	393,895	398,971	397,501	414,448	393,537	396,656	390,713
FS	355,355	352,644	363,931	366,982	388,570	360,673	363,006	358,718
GP	345,263	344,826	350,812	356,767	369,194	343,124	370,720	352,061
KN	334,528	344,638	351,835	376,789	392,331	345,987	363,331	347,783
LP	384,557	379,375	381,671	374,949	387,323	384,355	380,557	369,124
MP	366,363	367,781	370,562	382,137	391,981	369,704	368,686	365,373
NC	353,366	361,643	361,057	365,488	372,729	361,650	361,765	358,654
NW	401,035	421,187	391,060	395,405	407,774	397,191	406,944	382,689
WC	373,246	375,466	373,691	379,476	392,391	374,419	394,937	380,675
SA	365,793	367,239	371,243	371,427	385,654	366,361	376,710	371,732

5 Learner to non-educator ratios

A further driver of spending inequities with respect to the personnel budget would be the availability of non-educators in schools. As seen in Table 10 below, poorer schools are considerably less likely to enjoy the services of publicly paid non-educators such as grounds staff, cleaners and school administrators. The situation is most skewed in Eastern Cape and Limpopo. The overall value for Limpopo is moreover particularly low – only 54% of learners were in schools with publicly paid non-educator staff in 2016. It would be more difficult to ensure access amongst learners to non-educator staff in a context of a high proportion of very small schools. Yet the distribution of small schools explains very little of the inequalities seen in Table 10. If one considered only non-small schools, defined here as schools with an average grade group size of at least 28 learners, the overall national figure of 85% in Table 10 would shift only slightly, to 88%. (Average grade group size is the school's enrolment divided by the number of grades offered.) The Limpopo figure would move from 54% to 59%.

Table 10: Percentage of learners in schools with publicly paid non-educators in 2016

	Breakdown by quintile (1 is poorest)					By level		Overall
	1	2	3	4	5	Primary	Sec.	
EC	65	73	83	92	85	70	88	76
FS	96	100	98	99	97	97	99	98
GP	100	99	99	98	100	99	99	99
KN	86	82	85	82	58	82	79	81
LP	45	57	58	67	79	50	58	54
MP	99	99	98	97	95	99	99	99
NC	98	96	92	93	92	93	96	94
NW	93	94	96	92	78	94	94	94
WC	88	99	99	99	100	97	100	98
SA	79	82	87	93	88	84	86	85

Where non-educators do exist in a school, their distribution tends to favour richer schools. The large disparities across provinces are also noteworthy. For instance, non-educator provisioning, for schools that have at least one such person, is at least twice as generous in Gauteng and Northern Cape, compared to North West. This can be seen in Table 11.

Table 11: Learner to non-educator ratios in 2016

	Breakdown by quintile (1 is poorest)					By level		Overall
	1	2	3	4	5	Primary	Sec.	
EC	169	134	198	153	162	162	148	177
FS	158	209	177	131	115	188	120	166
GP	65	67	63	86	130	71	41	78
KN	131	155	229	215	298	171	114	182
LP	183	165	199	166	135	154	157	176
MP	193	238	244	219	286	216	143	219
NC	149	132	193	133	93	151	96	142
NW	242	338	343	198	140	293	168	284
WC	144	187	166	170	138	164	92	158
SA	137	147	150	127	145	136	91	144

6 Average annual non-educator cost

As seen in the next table, non-educators cost more in quintile 5 schools compared to schools in other quintiles. The significantly lower unit cost of non-educators in Gauteng compared to other provinces stands out. The very favourable ratio of learners to non-educators for Gauteng seen in Table 11 above is clearly possible in part because non-educators are less costly in this province.

Table 12: Average annual non-educator cost in 2016

	Breakdown by quintile (1 is poorest)					By level		Overall
	1	2	3	4	5	Primary	Sec.	
EC	120,460	129,380	146,105	176,182	184,362	121,067	181,366	128,911
FS	166,254	170,039	168,673	157,766	152,914	166,602	161,093	157,647
GP	91,137	93,776	93,997	108,515	150,551	100,938	112,445	95,710
KN	149,687	151,649	158,047	163,995	185,478	159,996	153,516	154,066
LP	131,372	121,783	143,136	173,890	167,288	106,850	192,452	149,138
MP	139,732	144,830	157,420	145,096	158,286	135,278	166,913	152,981
NC	175,140	176,961	176,905	181,616	178,842	176,939	179,223	176,600
NW	189,708	188,749	186,873	167,853	161,826	188,265	176,117	167,551
WC	158,795	159,963	157,414	166,480	156,085	162,210	155,098	148,552
SA	132,610	134,059	130,587	135,685	160,156	131,080	146,868	140,808

7 Spending outside the payroll system

The first three columns of Table 13 (without the bottom total row) reflect figures reported to the DBE by provincial education departments¹². The figures represent money spent per learner in the form of the school allocation in 2016. The figures may not reflect exactly what is paid to schools, as instances of provinces paying less than what is committed occur. But for the purposes of the current analysis we can probably consider these figures sufficient. There is also other non-personnel funding occurring outside the school allocation, for instance spending on scholar transport and nutrition. Ideally, these other categories should be included in the analysis. However, financial values by school (or quintile) for these categories are not easily obtainable at present. National values, and the values in the final three columns in Table 13 were calculated using the submitted school allocation values and enrolment figures.

¹² Compiled by Ralph Mehl in the Department of Basic Education.

Table 13: School allocation officially paid per learner 2016

	No fee	Quintile 4	Quintile 5	Primary	Sec.	Overall
EC	1,177	590	204	1,125	1,102	1,117
FS	1,177	590	240	1,044	1,018	1,035
GP	1,177	590	590	916	889	907
KN	955	522	179	818	805	808
LP	1,102	590	204	1,075	1,072	1,074
MP	1,010	503	173	947	951	969
NC	1,125	698	326	964	925	951
NW	1,177	605	204	1,117	1,071	1,102
WC	1,144	573	198	696	637	678
SA	1,097	573	327	977	961	972

The school allocation is the only expenditure item not reflected in the payroll data which is taken into account in the calculations of overall per learner spending in section 8. The school allocation is taken into account because relatively reliable data at the quintile and province level are available, and because the school allocation represents a sizeable portion of overall spending. Two other important channels of spending on schools not captured in the payroll system would be spending on Grade R and spending on the National School Nutrition Programme. Figures for these two spending areas are discussed briefly here, to provide a sense of the impact of excluding them on the per learner spending figures of section 8. There are also other current spending areas, such as scholar transport and additional learning materials for schools beyond what is purchased through the school allocation. Ideally, all this should be included, and this should be the aim in future reports of this nature. However, getting to this ideal will take considerable work, for instance analysing microdata from the Basic Accounting System (BAS) and gaining a good sense of the extent to which schools are considered cost centres in these data.

Spending on Grade R in public schools is meant to be entered under budget programme 5.1. Mostly this occurs, though the Estimates for Provincial Revenue and Expenditure (EPRE) suggest strongly that this is not done in Limpopo, given how low this province's figure is (for 2016/17 in the EPRE released in 2016). Total national spending in programme 5.1 was R3,558 million in 2016. Official figures indicate that Grade R enrolments in public schools came to around 774,000, giving a per Grade R learner spending figure of R4,594. Because this is less than spending per grades 1 to 12 learner, and because a few schools with Grade 1 still do not have Grade R, if one incorporates Grade R spending into the overall calculation of per learner spending in public schools, schools *without* Grade R will emerge on average as enjoying higher per learner spending. This would be confusing, and it seems best to keep accounting of Grade R per learner spending separate from grades 1 to 12 per learner spending.

Spending on the National School Nutrition Programme in 2016/17 was R6,060 million. Stats SA data indicate that in 2016 78% of public school learners received a school lunch at least some of the time – 70% received lunch all the time. Using the 78% figure produces an average of R601 per learner.

8 The overall public spending picture

8.1 The basic aggregate figures

The preceding tables from sections 3 to 7 were used in determining the overall personnel spending per learner, in Table 14, and overall current spending when the school allocation is included (Table 15). Each cell in Table 15 is calculated as follows:

$$e = \frac{c_e}{L/E} + \frac{c_n}{\frac{L}{N} \times \frac{100}{n}} + a$$

Expenditure on each learner, e , is the sum of the three terms (the bits on the right-hand side separated by '+'). The first term is educator cost expressed in per learner terms, which is the average cost of an educator (c_e), over the ratio of learners (L) to educators (E) – see Table 9 and Table 5. The second term is non-educator cost expressed in per learner terms, which is calculated using the ratio of learners (L) to non-educators (N) in schools which have non-educators, the percentage of learners in schools with non-educators (n) and the average cost of a non-educator (c_n) – see Table 11, Table 10 and Table 12. Then the school allocation per learner (a) is added – see Table 13.

What Table 15 below shows is that despite the many inequalities seen in the previous tables, to a large extent these cancel each other out, so that the final outcome is a relatively equal level of per learner spending. In particular, lower per educator costs in poor quintiles (Table 9) are offset by more favourable learner-educator (LE) ratios (Table 5) and a higher school allocation (Table 13) in the poorer quintiles. The slope for per learner spending in Table 15 is almost perfectly pro-poor – the only anomaly is that quintile 5 enjoys a slightly higher figure than quintile 4. Per learner spending in quintile 1 is 7% higher than in quintile 5 – see the pro-poorness statistics in Table 16. However, there are noteworthy provincial deviations from the national pattern. One province, Gauteng, displays a regressive (pro-rich) slope, if this slope is calculated across all five quintiles. This is probably a more concerning indicator than simply spending in quintile 1 relative to quintile 5 – if one does use the latter, one should add Eastern Cape, Northern Cape and North West to the list.

In one key respect Gauteng is very different from all the other provinces. Per learner spending at the primary level is 30% lower than at the secondary level, a difference which is much larger than for any other province. The average difference for the other eight provinces is 13%. This unusual feature of Gauteng has been noted previously and seems to be the result of the unusual way in which this province runs the educator post provisioning model.

If one focusses just on personnel, so Table 14, the picture is far less progressive (pro-poor). The national slope calculated on the basis of the values in Table 14 is slightly pro-poor, but this is driven by two very pro-poor provinces, Limpopo and Mpumalanga. All the other seven provinces display positive (not pro-poor) slopes – see the second-last column of Table 16.

Table 14: Average personnel spending per learner in 2016

	Breakdown by quintile (1 is poorest)					By level		Overall
	1	2	3	4	5	Primary	Sec.	
EC	12,071	13,812	12,444	12,487	14,000	12,528	13,455	12,198
FS	13,262	12,212	12,926	13,161	13,608	12,116	15,256	12,693
GP	11,258	11,500	12,055	11,866	12,133	10,585	15,536	11,626
KN	12,742	12,469	11,596	12,570	13,115	11,833	13,786	12,074
LP	13,007	12,784	12,136	12,347	11,991	12,178	13,670	12,304
MP	14,316	13,269	13,073	13,198	12,313	13,612	14,457	13,516
NC	12,444	12,819	11,729	12,944	13,360	11,835	13,702	12,258
NW	13,184	13,569	12,245	13,206	14,349	12,596	16,003	12,254
WC	12,197	11,297	11,564	11,608	12,194	11,170	13,842	11,663
SA	12,725	12,698	12,082	12,209	12,619	11,905	14,269	12,445

Table 15: Average current spending per learner in 2016

	Breakdown by quintile (1 is poorest)					By level		Overall
	1	2	3	4	5	Primary	Sec.	
EC	13,248	14,989	13,621	13,077	14,204	13,653	14,556	13,314
FS	14,439	13,389	14,103	13,751	13,848	13,160	16,274	13,725
GP	12,435	12,677	13,232	12,456	12,723	11,501	16,424	12,528
KN	13,697	13,424	12,551	13,092	13,294	12,652	14,590	12,878
LP	14,109	13,886	13,238	12,937	12,195	13,253	14,742	13,377
MP	15,326	14,279	14,083	13,701	12,486	14,559	15,409	14,483
NC	13,569	13,944	12,854	13,642	13,686	12,799	14,626	13,206
NW	14,361	14,746	13,422	13,811	14,553	13,712	17,074	13,353
WC	13,341	12,441	12,708	12,181	12,392	11,866	14,479	12,336
SA	13,822	13,795	13,179	12,783	12,946	12,882	15,231	13,413

Table 16: Pro-poorness of the per learning spending figures in 2016

Quintile 1 over quintile 5 – greater than 1.00 means pro-poor		Slope across all five quintiles (using SLOPE in Excel) – negative means pro-poor	
Just personnel (Table 14)	All current (Table 15)	Just personnel (Table 14)	All current (Table 15)
EC	0.86	253	0
FS	0.97	164	-82
GP	0.93	212	36
KN	0.97	85	-114
LP	1.08	-247	-478
MP	1.16	-408	-626
NC	0.93	196	-7
NW	0.92	197	-55
WC	1.00	30	-216
SA	1.01	-70	-277

It should of course be remembered that the Table 15 and Table 16 figures do not include current spending items other than the school allocation, for instance spending on nutrition, which comes to R601 per learner for the 78% of learners who are recipients of this programme (see section 7). Had this been included, the overall picture would almost certainly have been more pro-poor.

8.2 Comparison against official expenditure totals

Table 17 below provides a check on the comprehensiveness of the figures used for the foregoing analysis. It is important to bear in mind that the focus of the current report is not total spending, but inequalities in spending across schools. The inequality statistics presented above have limitations, in particular because one month's Persal payroll data, that of November 2016, were used to estimate the annual cost per employee (educators and non-educators separately). Unit costs were then multiplied by educator and non-educator numbers reflected in the *January 2016* Snap Survey data. Clearly educator numbers do not remain constant across all months. Moreover, unit costs officially increase in April, though increases are generally implemented, with back-pay, a few months later (but hardly ever as late as November). All this could cause some inaccuracies with regard to inequalities, though the inaccuracies are more likely to be seen if one compares totals. However, it is not totals we are interested in, but rather inequalities, meaning the accounting problems described here would almost certainly not change the report's conclusions in any substantial way. Nevertheless, it is important to compare figures described above to official estimates of total expenditure. This is what Table 17 does.

Personnel spending for November 2016 seen in Persal, considering only employees linkable to public ordinary schools, multiplied by 12 months, is reflected in column C. Column B

reflects budget programme 2 spending on ‘compensation of employees’ reported in the Estimates of Provincial Revenue and Expenditure (EPRE) released by each provincial treasury in 2017¹³. The EPRE figures are pre-audited estimates. Programme 2 is public ordinary schooling. The ratio C over B is very close to 1.00 – the Persal data gives an estimate just 1% higher than what one gets using the EPREs. One would expect this ratio to be a bit higher if one takes into account the fact that around 3% of employees who probably should be linkable to a school are not (see explanation in section 4).

However, if as our numerator we use per learner spending on personnel multiplied by the number of learners, we obtain a much lower ratio of 0.92. This reflects in part the fact that the number of personnel seen in Persal in November 2016 is higher than the numbers seen in the survey of January 2016 (though Persal in November is around 3% *lower* than what Persal suggests it should be in *November*). There were in fact 4% more educators in November’s Persal who could be linked to a school, compared to January’s Snap total. The difference for non-educators was 2%.

The right-hand panel Table 17 looks at all current spending, with programmes 2.1 (primary schooling) and 2.2 (secondary schooling) being included in the EPRE estimates. Figures from the current report produce a total that is 4% below what is reflected in the two sub-programmes in the EPREs. This should not surprise us in part as one would expect the school allocation on its own to under-estimate total non-personnel current spending on schools.

The EPRE figures would moreover not be entirely accurate. In the past, pre-audited spending figures of the kind used for Table 17 have tended to be roughly 1.0% *higher* than finalised audited figures.

All in all, the discrepancies between the EPRE figures and the figures used in the current report do not seem serious given the intentions of the current report.

Table 17: Current analysis versus EPRE figures

Personnel (R million)						All current (R million)		
	Table 14 figures × grades 1 to 12 enrolment (A)	EPRE pre- audited Prog. 2 personnel (B)	A / B	Raw total from Persal (C)	C / B	Table 15 figures × grades 1 to 12 enrolment (D)	EPRE pre- audited sub- progs. 2.1 and 2.2 (E)	D / E
EC	22,073	21,158	1.04	21,733	1.03	24,092	23,107	1.04
FS	8,126	8,362	0.97	8,202	0.98	8,787	8,640	1.02
GP	22,522	23,685	0.95	23,990	1.01	24,269	28,025	0.87
KN	29,867	34,082	0.88	34,661	1.02	31,854	36,439	0.87
LP	19,399	19,996	0.97	19,721	0.99	21,091	22,381	0.94
MP	12,694	12,651	1.00	12,935	1.02	13,603	13,713	0.99
NC	3,345	3,574	0.94	3,551	0.99	3,604	3,853	0.94
NW	9,334	9,051	1.03	9,991	1.10	10,171	10,012	1.02
WC	11,668	12,165	0.96	11,728	0.96	12,341	13,815	0.89
SA	142,018	144,723	0.98	146,511	1.01	153,062	159,984	0.96

8.3 Inequalities within provinces and quintiles

The following two graphs illustrate the distribution of spending per learner by province, for primary-level learners, and secondary-level learners. In cases where both levels exist within a school, learners in, say, grades 1 to 7 made use of the school’s overall per learner spending figure.

¹³ National Treasury publishes standardised spreadsheets drawing from these reports on its website.

The problem with reading too much into the distributions seen in Figure 4 and Figure 5 is that some inequality is necessitated by the system. Above all, per learner spending in smaller schools must be more generous than per learner spending in larger schools. Thus a province with many small schools, such as Eastern Cape, will emerge in a superficial analysis as highly unequal in per learner spending terms, relative to a province such as Gauteng with hardly any small schools. But this is not necessarily ‘bad inequality’. Bad inequality, one might argue, would arise where learners in similarly sized schools receive very different per learner spending.

Figure 4: Distribution of per learner spending at the primary level (2016)

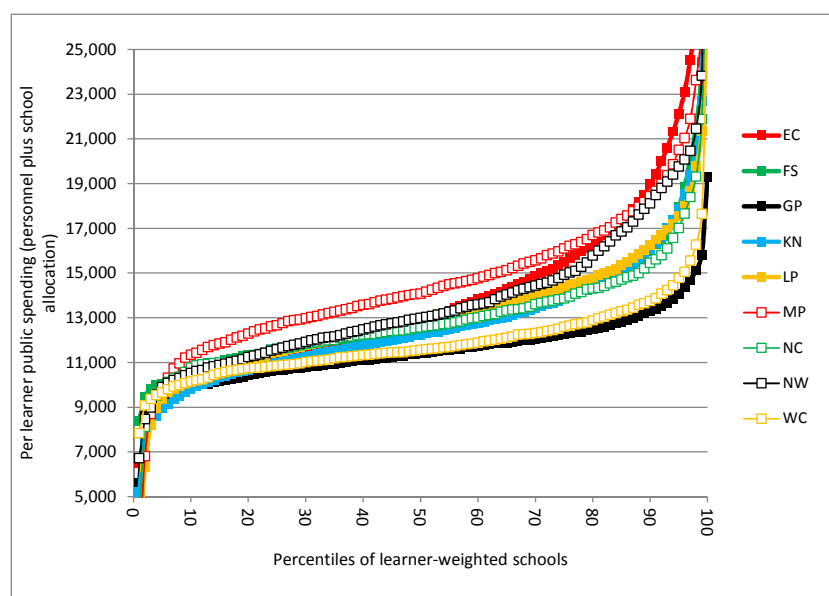


Figure 5: Distribution of per learner spending at the secondary level (2016)

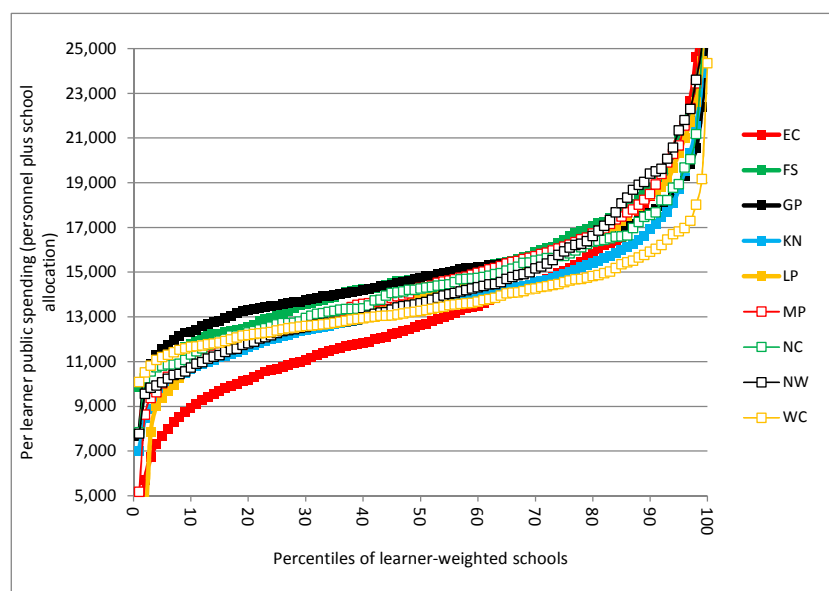
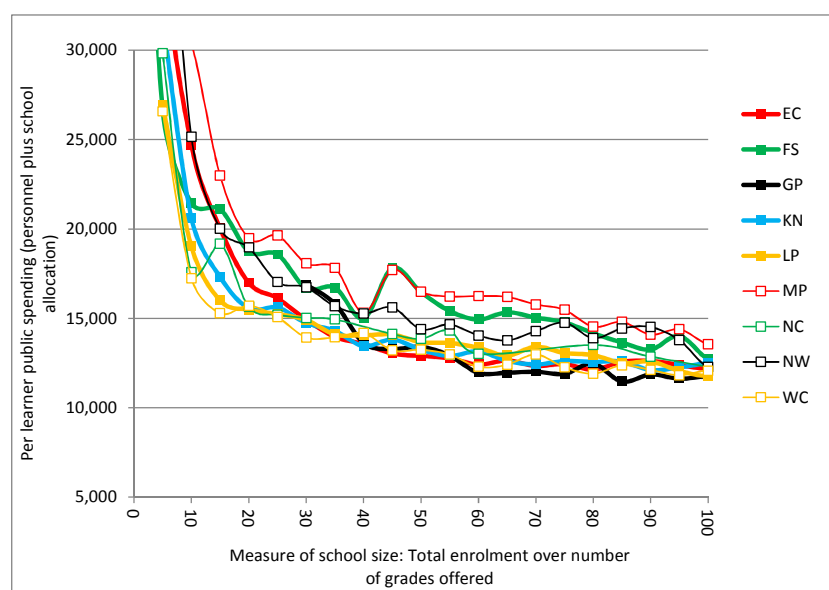


Figure 6 below illustrates the point that smaller schools attract more per learner spending. This is true in South Africa and virtually everywhere else, because there is a limit to how much multi-grade teaching one can expect one teacher to do, and one cannot, say, allocate half a teacher to a school with just 20 learners. One must allocate a whole teacher. Technically, it is not school size as such which correlates strongly with per learner spending, but what we might call the school’s average grade group size, or total enrolment divided by

the number of grades offered. To illustrate, a school with 40 learners in just one grade would be staffed less favourably than a school with 40 learners distributed across grades 1 to 7.

Figure 6: Per learner spending and school size (2016)



Note: Each school's average grade group size (the indicator on the horizontal axis) was rounded to the nearest multiple of 5. Moreover, any point representing 10 or fewer schools was removed from the graph. This explains why, for instance, Gauteng's curve only starts at 30.

The following two tables illustrate the degree of variation in per learner funding. Their aim is largely to answer questions such as: Is there more inequality *between* provinces or *within* provinces. This has important policy implications. Table 18 is potentially misleading as it analyses all schools with primary-level learners, regardless of school size. We thus begin with the second table, Table 19, which includes only non-small schools, specifically schools where the average grade group size is 40 or above. Figure 6 above suggests that beyond this threshold school size should not make a big difference to per learner funding. It turns out that Table 19 and Table 18 actually produce rather similar statistics, meaning in part that even in a province such as Eastern Cape, the presence of small schools does not overly affect the analysis of spending inequalities. A further reason why the two tables would look similar is that the 'within' statistics are weighted by learners, meaning that statistics are not unduly influenced by small schools.

The statistic in the last row of Table 19, 5%, is a measure of the inequality of the provincial average per spending amounts, so roughly the figures shown in the column 'Primary' in Table 15 (though those figures reflect all primary schooling, not just non-small schools). What does this 5% mean? It is the average across nine provincial absolute differences, expressed as a percentage, where each provincial difference is the difference between that province's mean and the mean across the nine provincial values. Thus the absolute (positive) difference between the KwaZulu-Natal mean, which is R12,743, and the mean across the nine provincial values, which is R13,081, is found. This difference is R338, which is 3% of R13,081. The 5% in the bottom row of Table 19 is the average across the nine provincial percentages. The other values in the three tables are calculated in a similar fashion. These statistics are thus similar to the standard deviation, but they are simpler to understand. Each figure is the variation in the per learner spending figures expressed as the average distance from the mean. Whilst the differences across the nine provincial averages for non-small primary schools is represented by 5%, much higher figures represent the variation *within* each province (see the last column of Table 19). There is thus far more inequality within provinces than across provinces.

There are of course across-quintile inequalities, which one would expect as quintiles are not supposed to be funded equally – this is the ‘good inequality’. Very importantly, however, even inequalities *within* each quintile in each province are high. And for primary learners in non-small schools, the within-quintile variation is higher the poorer the quintile. Closer analysis of the data reveals that by far the largest factor for this is greater inequalities in poorer schools with respect to the LE ratio. Inequalities with respect to the average cost of an educator is a minor factor. This suggests that more attention should go towards the filling of vacant posts in poorer schools (we can probably assume that posts are allocated in a manner which promotes equity and pro-poor provisioning, so the problem is implementation, rather than the official allocation).

In Table 19, the values specific to quintile and province (so the values in the large panel of the table) produce an average of 17. The across-quintile inequality statistics for the nine provinces produce an average of 5. We could thus say that inequality *within* each quintile (and province) is three times as high as the disparities across quintiles, or three times as high as the disparities across the provincial averages (see the 5% in the last row).

A further noteworthy pattern in Table 19 is that the two highly urban provinces, Gauteng and Western Cape, have low levels of within-quintile inequality. Eastern Cape and Mpumalanga display particularly high levels of within-quintile inequality.

Table 18: Distance from mean of per learner funding – all primary (2016)

	Within each province and quintile					Across quintiles	Within each province
	1	2	3	4	5		
EC	26	31	26	23	16	5	28
FS	44	18	16	25	15	3	34
GP	10	9	11	10	9	3	10
KN	23	20	17	17	17	6	21
LP	18	15	18	28	17	5	17
MP	21	17	18	26	32	8	21
NC	21	18	17	18	14	4	19
NW	26	19	20	27	13	6	23
WC	25	15	11	9	10	4	15
SA	25	23	20	16	14	6	23
SA – across provinces							6

Table 19: Distance from mean of per learner funding – non-small primary (2016)

	Within each province and quintile					Across quintiles	Within each province
	1	2	3	4	5		
EC	24	26	23	21	16	5	25
FS	23	14	15	23	15	3	19
GP	10	9	11	10	9	3	10
KN	20	18	15	16	17	5	19
LP	16	15	17	28	17	5	16
MP	20	17	18	26	32	8	19
NC	18	14	16	15	14	4	16
NW	23	18	18	20	13	6	20
WC	18	14	11	9	10	4	13
SA	21	20	18	15	14	6	20
SA – across provinces							5

One would expect the inequality indicators in Table 20, for secondary schooling, to be a bit higher than those of Table 19, given that the post provisioning norms are sensitive to different subject combinations in grades 10 to 12. The fact that on the whole the within-quintile values are very similar for primary and secondary schooling suggests that primary school inequality

is higher than it should be, possibly because it is easier to fill posts at the secondary level than the primary level, or because the filling of posts at the secondary level is considered more urgent.

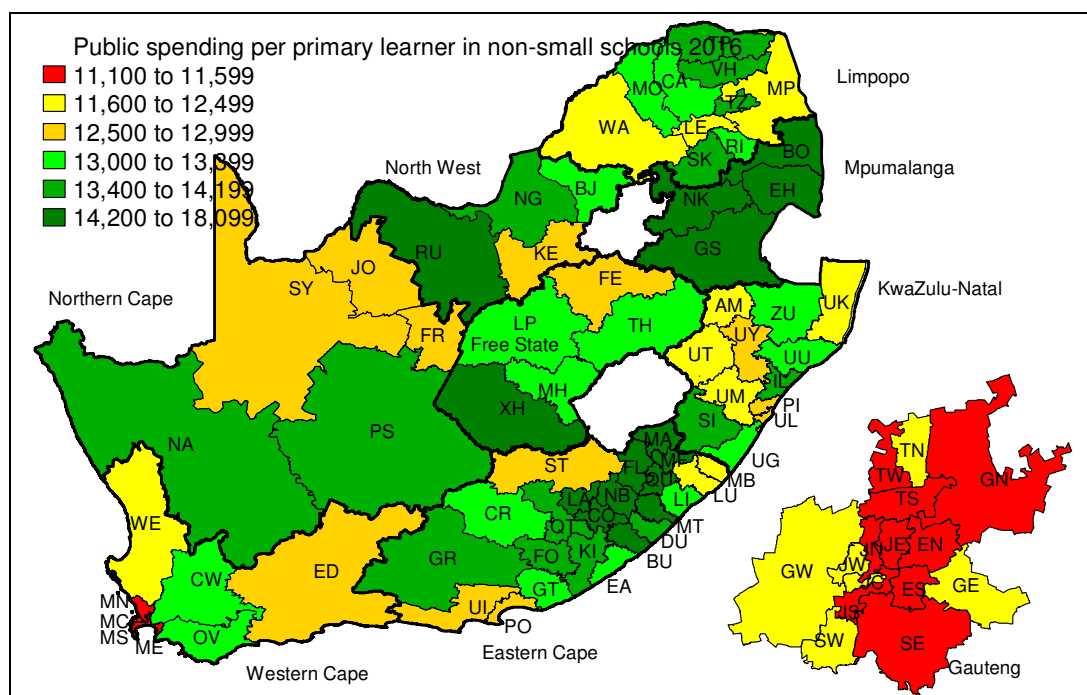
Table 20: Distance of mean of per learner funding – secondary (2016)

	Within each province and quintile					Across quintiles	Within each province
	1	2	3	4	5		
EC	26	28	25	26	17	6	25
FS	20	12	16	19	16	2	17
GP	10	10	11	12	12	3	12
KN	21	18	15	16	15	4	17
LP	21	19	18	11	18	3	19
MP	20	17	16	28	21	5	19
NC	14	13	16	15	15	6	15
NW	23	19	18	20	16	6	20
WC	11	11	11	11	10	2	11
SA	21	19	18	15	14	2	18
SA – across provinces							3

8.4 Inequities across districts

The following map helps in the interpretation of figures seen in the previous sub-sections. The focus here is only on the primary level following the conclusion in the previous sub-section that inequities at this level are particularly serious. What is striking about Eastern Cape, is that rural districts one would expect to have similar levels of per learner funding actually display rather different values. Two rural districts, Lusikisiki (LU) and Mbizana (MB), are worse funded than one would expect. This ties up with the earlier finding that within-quintile inequalities in Eastern Cape stand out as high. On the whole, urban areas are funded at a somewhat lower level, which is probably remarkable for a developing country, and reflects the pro-poor and pro-rural intentions of our policies. In fact, figures from Table 15 indicate that per learner funding in Gauteng and Western Cape (the two provinces with ‘red districts’ in the map) is 7% and 8% below the national average. Of course this is in part facilitated by the economies of scale made possible by large urban areas. Nevertheless, the literature suggests this is unusual and particularly pro-rural if one makes comparisons to other developing countries, where rural areas are often far more marginalised than in South Africa.

Figure 7: Per learner funding per district – non-small primary (2016)



9 How private funding changes the picture

Fee income per school for recent years is not easily accessible. What serves as a good proxy for this, and here the data are good, is privately paid personnel per school.

Table 21 provides the raw numbers of privately paid educators, broken down by province and quintile. What is noteworthy is that educators paid privately, meaning by the school governing body, exist even in quintiles 1 to 3, where fees are not supposed to be charged. Importantly, privately paid educators in quintiles 1 to 3 are more likely to be part-time employees, relative to privately paid educators in quintiles 4 to 5. To illustrate, 11% of privately paid educators are working part-time in quintiles 1 and 2, against 7% in quintile 5. Anecdotal evidence suggests that many schools serving poorer communities do succeed in collecting enough money through private contributions by parents, or use a part of the school allocation, to pay qualified (or partially qualified) educators from the community to teach at a very low salary.

Table 21: Privately paid teaching staff in 2016

	Breakdown by quintile (1 is poorest)					By level		Overall
	1	2	3	4	5	Primary	Sec.	
EC	1,032	493	986	524	1,651	2,759	1,938	4,697
FS	166	96	144	330	1,013	1,143	606	1,749
GP	23	32	294	1,182	4,940	4,267	2,204	6,471
KN	383	466	428	952	3,246	3,685	1,808	5,493
LP	293	200	248	73	659	888	587	1,475
MP	332	343	129	168	475	939	512	1,451
NC	27	39	53	58	390	360	207	567
NW	164	114	286	866	234	1,029	666	1,695
WC	160	126	196	662	4,143	3,535	1,783	5,318
SA	2,580	1,909	2,764	4,815	16,751	18,602	10,314	28,916

Note: There is a small difference between the quintile-specific values and the total values in the last column due to the fact that the quintiles of a few schools in the data are not indicated.

Table 22 indicates what the learner-educator (LE) ratio is by province and quintile if privately paid educators are taken into account. Table 23 provides the difference between Table 22 and

the earlier Table 5, in other words the LE ratio benefit enjoyed by schools as a result of supplementary private funding, which in part pays for additional educators. The difference is as much as 10 learners in quintile 5. Even in quintiles 1 to 3, the presence of privately paid educators makes a small difference to the overall LE ratio.

Table 22: Learner-educator ratios (including privately paid staff) in 2016

	Breakdown by quintile (1 is poorest)					By level		Overall
	1	2	3	4	5	Primary	Sec.	
EC	32.8	29.6	33.1	26.7	20.3	34.0	29.3	31.2
FS	30.1	32.2	31.3	26.8	22.4	34.0	24.5	29.5
GP	33.2	32.5	31.0	29.9	24.3	33.3	26.4	29.4
KN	28.9	30.0	32.6	30.0	24.2	33.9	27.2	29.6
LP	31.7	32.2	33.6	26.8	23.8	38.6	28.6	32.0
MP	27.9	29.9	29.9	25.6	23.5	32.0	26.8	28.6
NC	30.1	29.8	32.3	29.5	22.8	33.2	27.2	29.2
NW	33.8	33.7	34.3	24.4	21.8	37.0	25.3	32.4
WC	30.3	34.2	33.3	32.6	25.4	33.2	27.7	29.9
SA	30.9	31.1	32.6	29.6	24.0	34.3	27.3	30.2

Table 23: Learner-educator ratio advantage due to private staff in 2016

	Breakdown by quintile (1 is poorest)					By level		Overall
	1	2	3	4	5	Primary	Sec.	
EC	1.9	1.3	1.6	9.8	13.3	2.6	3.1	2.7
FS	0.7	0.6	0.8	5.9	10.7	3.0	1.9	2.5
GP	0.2	0.3	0.8	2.6	9.2	4.2	2.4	3.3
KN	0.7	0.7	0.6	2.9	7.9	2.5	1.5	2.0
LP	0.6	0.4	0.9	5.7	13.4	1.4	0.8	1.0
MP	0.6	0.8	1.3	6.1	11.0	1.5	1.1	1.3
NC	0.6	1.2	1.2	1.3	8.6	2.5	2.2	2.3
NW	0.9	0.8	1.1	8.8	10.3	2.6	2.1	2.3
WC	4.7	3.4	3.0	4.6	11.7	8.8	5.0	7.0
SA	1.0	0.8	1.1	3.9	10.0	3.2	2.0	2.6

The following four graphs look at the distribution of private resourcing, in the form of privately paid educators. The indicator on the vertical axis of each graph is all educators divided by just publicly paid educators. Thus a value of 2.0 would mean that half of all educators are privately paid, 1.5 means privately paid educators come to 50% of the number of publicly paid educators (meaning they constitute a third of the school's educators), and so on. As one might expect, Figure 8 and Figure 9 indicate that quintile 5 schools have by far the highest values, followed by quintile 4. However, there are large differences within each of these quintiles. In quintile 5, 14% of learners at the secondary level are in schools with no privately paid educators, meaning fees would be relatively low (the figure is 7% for the primary level). At the other end of the spectrum, 5% of quintile 5 secondary learners are in schools where half or more of the educators are privately paid (the figure is 10% for primary learners). Quintiles 1, 2 and 3 are similar in the sense that here around 25% of learners are in schools with privately paid educators, at the primary and secondary levels. Figure 10 shows that Western Cape has a much higher proportion of privately paid educators than the other provinces. Finally, Figure 11 indicates that the distribution is similar at the primary and secondary levels. Note that Figure 11 does not imply that fees would be the same at the primary and secondary levels. Because public spending per learner is higher at the secondary than at the primary level, if the private 'top-up' is similar in proportional terms across the two levels, the absolute fee amounts are likely to be higher at the secondary level.

Figure 8: Privately funded educators – primary by quintile

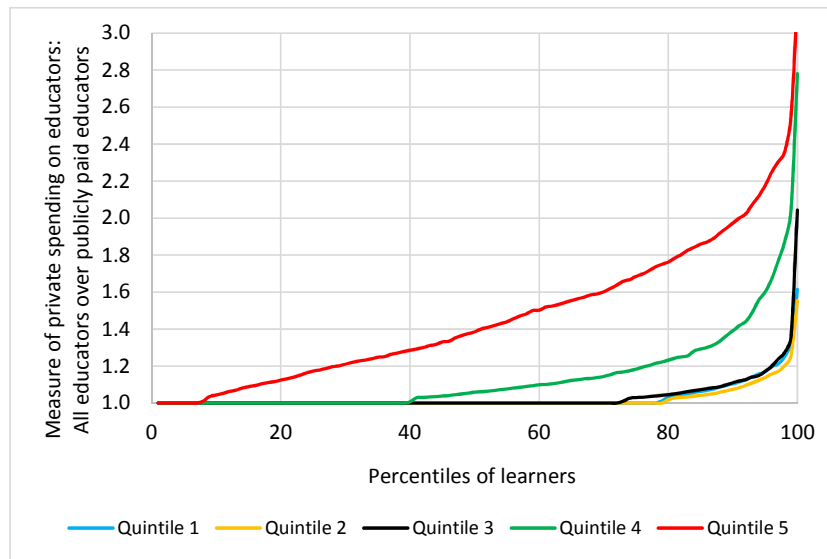


Figure 9: Privately funded educators – secondary by quintile

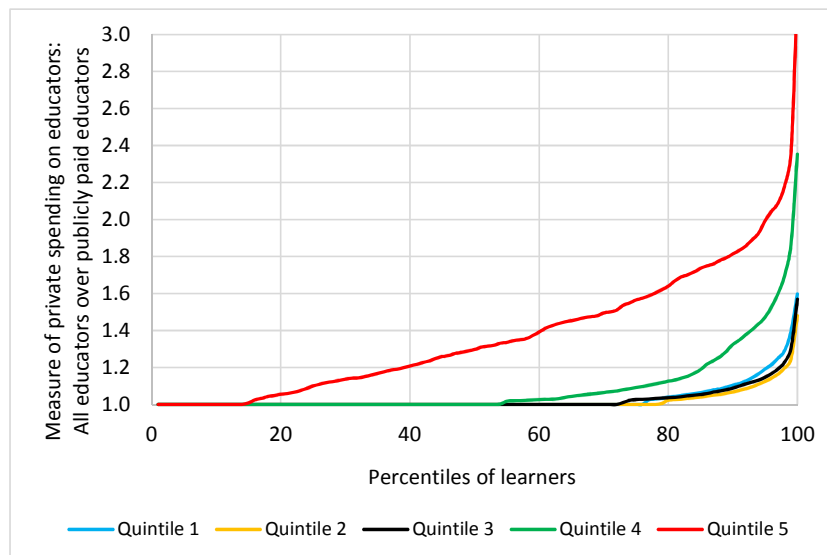


Figure 10: Privately funded educators – by province

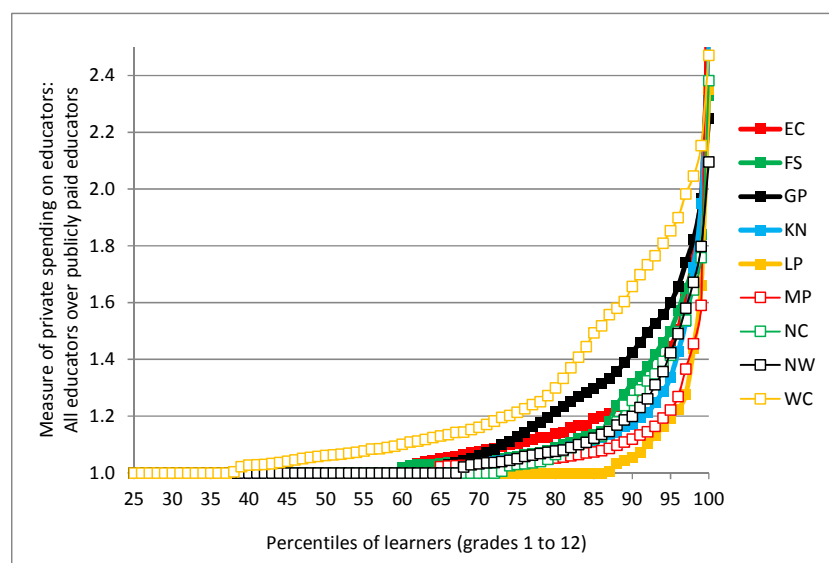
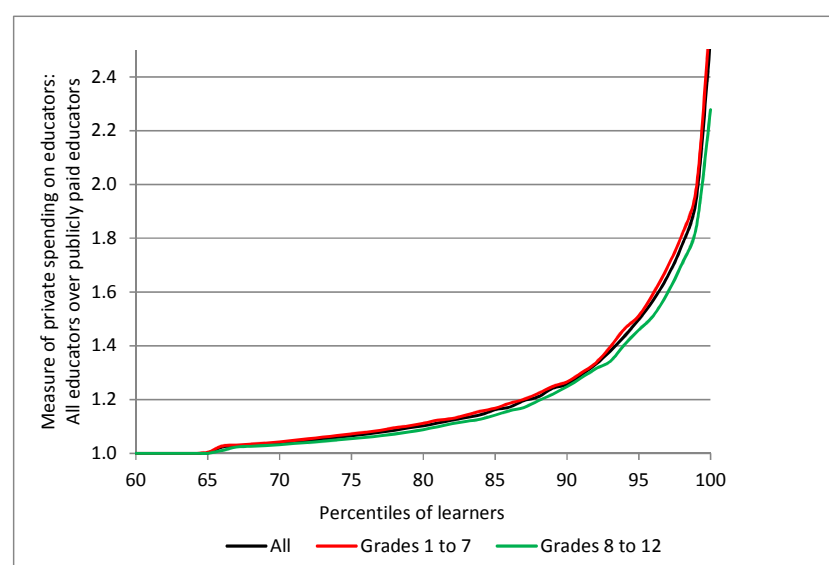


Figure 11: Privately funded educators – overall



What do the above four graphs suggest about inequality in the overall funding of the schooling system? Using the values behind the 'All' curve of Figure 11, we can conclude that the best funded 10% of the system is 64% better off in terms of funding than the worst 10% funded. We can also say that that the best funded 20% of the system is 41% better off than the worst funded 20% of the system. These are rough figures, because they assume public funding is exactly equal (it is not exactly equal, but it is close to equal), and they assume that the funding of educators represents overall funding well. These assumptions are fairly reliable, so the rough figures quoted here can guide the policy debates.

Turning to privately paid non-educators, Table 24 below illustrates the distribution of these employees across the system, whilst Table 25 'updates' the earlier Table 10, which considered only publicly paid non-educators when determining what proportion of learners were in schools with non-educators. The overall figure of 85% in Table 10 becomes 92% in Table 25. Importantly, it is in the schools serving the poorest communities, specifically quintiles 1 to 3, where the figures change most across the two tables. This is not ideal. More disadvantaged

schools should not have to depend to a larger degree than advantaged schools on the employment of support staff through private means.

Table 24: Privately paid non-educator staff in 2016

	Breakdown by quintile (1 is poorest)					By level		Overall
	1	2	3	4	5	Primary	Sec.	
EC	1,713	858	1,287	432	1,674	4,113	1,857	5,970
FS	139	38	96	241	697	720	491	1,211
GP	65	70	406	1,356	4,570	4,061	2,406	6,467
KN	514	781	936	591	1,032	2,658	1,202	3,860
LP	2,650	2,602	1,469	138	736	4,599	3,013	7,612
MP	169	240	82	243	516	645	610	1,255
NC	115	73	103	110	376	455	322	777
NW	234	214	454	856	267	1,143	919	2,062
WC	407	133	218	352	2,853	2,499	1,500	3,999
SA	6,006	5,009	5,051	4,319	12,721	20,817	12,396	33,213

Note: There is a small difference between the quintile-specific values and the total values in the last column due to the fact that the quintiles of a few schools in the data are not indicated.

Table 25: Percentage of learners in schools with any non-educators in 2016

	Breakdown by quintile (1 is poorest)					By level		Overall
	1	2	3	4	5	Primary	Sec.	
EC	82	85	90	98	98	83	95	87
FS	97	100	98	99	98	97	99	98
GP	100	99	99	99	100	99	99	99
KN	87	84	88	84	58	84	80	83
LP	85	87	90	100	97	86	89	87
MP	100	99	98	97	100	99	99	99
NC	98	98	94	94	94	95	98	96
NW	97	98	99	100	100	98	97	98
WC	99	100	99	100	100	100	100	100
SA	91	91	93	95	90	92	93	92

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