Education, poverty and affluence – a South African perspective

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**Keynote address,
Conference of the Economic Society of South Africa,
Bloemfontein,
25 September 2013**

This presentation draws heavily on the research of colleagues in ReSEP

Thesis

- The failure of our school system lies at the heart of our failure to increase social mobility and to reduce income inequality

- Inequality cannot be reduced fundamentally and lastingly without providing a good education for the bulk of the population

- Most other policy measures to meet aspirations of the poor or to change the racial contours of our social landscape are only palliatives and have only minimal effects, often at a cost in terms of efficiency and encouraging rent-seeking, e.g.

  - Interventions undermining rather than strengthening the working of the labour market
  - Policies that empower the few, while leaving the main cause of disempowerment – weak education – untouched

Two strong South African regularities

Log of wage, 2005 (conditional)
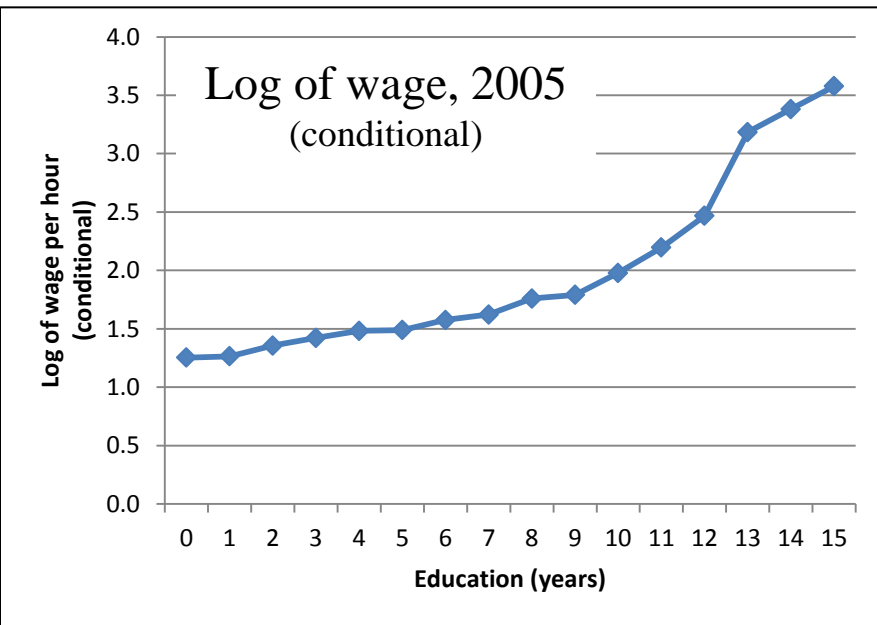
• **Labour market** (Mincerian returns to education) – a strong and convex positive relationship

Maths score and Socio-economic Status
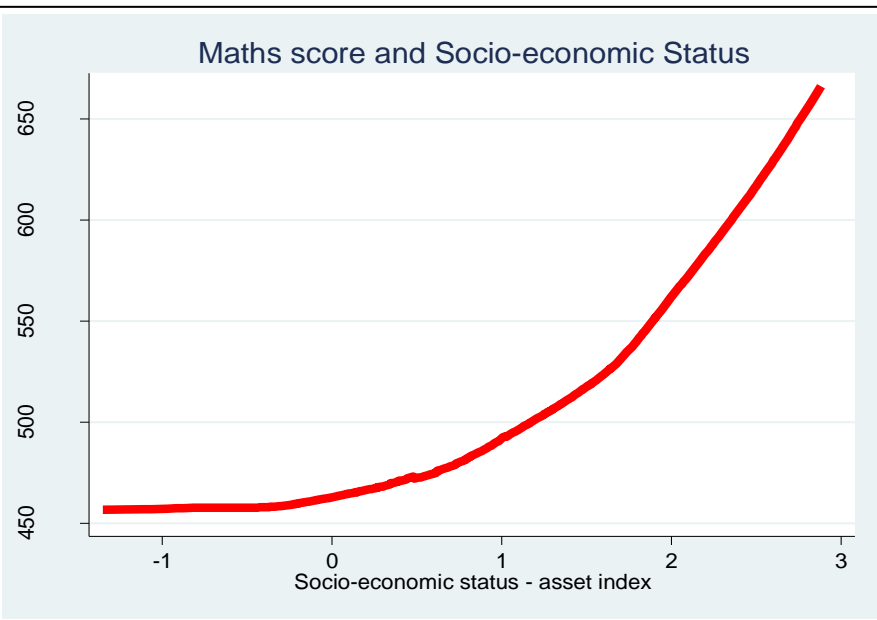
• **School system** (social gradient) – a strong and convex positive relationship

Two major issues to be addressed

- What is the role of education in employment and earnings?
  - Requires Mincerian earnings functions, but also an implicitly <u>causal</u> interpretation, which is problematic
    - There is a major endogeneity issue: Does education cause higher productivity and thus earnings, or does higher ability cause both higher education and earnings?
  - Most would agree that education has <u>some</u> causal effect; the dispute is about its magnitude

- What is the quality of education offered to poor children?
  - Requires education production functions, or social gradients
    - Is weak education quality because children are from poor homes, or because schools that serve the poor are dysfunctional?

In a nutshell…

- **Labour market inequality** is central to overall inequality and to poverty

- **Weak education** is central to wage inequality

- **Classroom behaviour** is central to learning, and thus to educational quality and quantity

- Features of classroom behaviour include l**ow levels of cognitive demand, low curriculum coverage, little teacher accountability**

SA's dualistic school system and labour market

High productivity jobs & incomes

- ±10-15% of labour force – mainly professional, managerial & skilled jobs
- Requires degree, good quality matric, or good vocational skills
- Historically mainly whites

High quality schools

- ±10-15 % of schools, mainly former (though no longer) white
- Produce strong cognitive skills
- Teachers qualified, schools functional, good assessment, parent involvement

- Vocational training
- Affirmative action

- Some talented, motivated or lucky students manage the transition

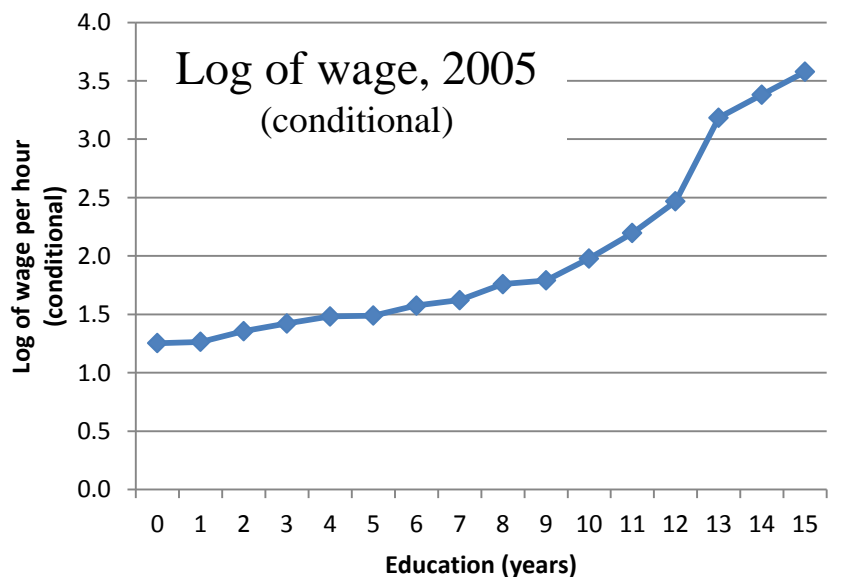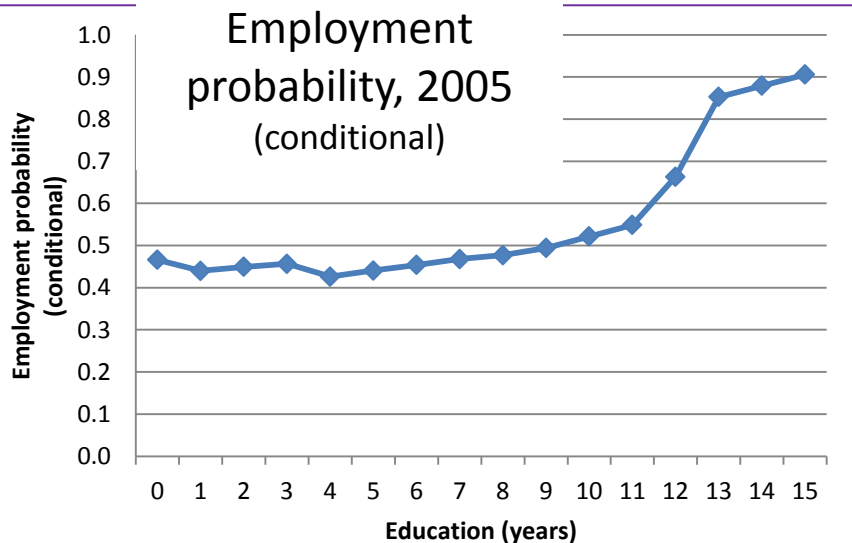- Big demand for good schools, despite fees
- A few schools cross the divide

Low productivity jobs & incomes

- Often manual or low skill jobs
- Limited or low quality education
- Minimum wage can exceed their productivity

Low quality schools

- Very weak cognitive skills
- Teachers less qualified, de-motivated, schools dysfunctional, assessment weak, little parental involvement, strong unions
- Mainly former black (DET) schools

Education's influence on labour market

Employment probability, 2005 (conditional)

Y-axis: Employment probability (conditional), 0.0 to 1.0
X-axis: Education (years), 0 to 15

Log of wage, 2005 (conditional)

Y-axis: Log of wage per hour (conditional), 0.0 to 4.0
X-axis: Education (years), 0 to 15

- **Skills shortage** at top end generates a wage premium:
  - **A worker with Grade 11 earns only 80% as much as a matriculant, a graduate 3½ times as much** (conditional upon race, gender, experience)
- **Oversupply of unskilled** depresses their wages
- Skills premium and distribution of educational attainment are **central to SA income inequality**

Wage inequality & income distribution

- Wage distribution statistically "explains" 77.9% of overall income inequality between households (ignoring household size)
  - Two-thirds of households earn wages, but Gini of 0.651 for household wage income reflects large inequality in wage levels and earners per household
  - Across all households, the Gini would have been 0.770 if wages were the only income source

- Leibbrandt et al. (2009) ascribe two-thirds of household wage earnings inequality to inequality in **wage levels** rather than the fraction of **household members working**

Decomposing inequality between households by income source, IES2005

Income source		Wage	Transfer	Residual	Total
% of households receiving this income source	P_k	65.9%	45.5%	71.5%	
Mean income from source		R36 588	R3 397	R11 292	R51 277
Share in total income	S_k	71.3%	6.6%	22,0%	
Gini for income source for hholds receiving such income	G_a	0.651	0.457	0.829	
Gini for income source for all households	G_k	0.770	0.753	0.878	
Gini correlation with total income rankings	R_k	0.923	0.028	0.734	
Contributions to Gini of total income	$S_k G_k R_k$	0.507	0.001	0.142	0.6501
% share in overall Gini		**77.9%**	0.2%	21.9%	
Effect on overall Gini of a 1% increase in income source	$S_j(R_j G_j - G)$	0.507	0.001	0.142	

Note: $G_k = P_k * G_a + (1 - P_k)$

Decomposing inequality between households by income source

$S_k G_k R_k$ = "Contribution" of each income source to Gini of total income

P_k = % of households receiving income source k

S_k = Share in total income of income source k

G_a = Gini for income source for hholds receiving such income

G_k = Gini for income source for all hholds

Note: $G_k = P_k * G_a + (1 - P_k)$

R_k = Gini correlation with total income rankings

Note: $R_k = Cov(Y_k, RankY) / Cov(Y_k, RankY_k)$

"The Gini correlation for source *k* is defined as the covariance between income from source *k* and the rank of total income, divided by the covariance between income from source *k* and the rank of source *k*." (Cancian & Reed 1998: 74)

For previous SA application, cf. Leibbrandt, Woolard & Bhorat 2001

Wage inequality & income distribution

Gini for wages amongst the employed is steady at ± 0.60

Other factors that could affect distribution:

- Household size – worsens Gini
- Household composition – worsens Gini
- Unemployment – worsens Gini
- Dividends, property income – worsen Gini
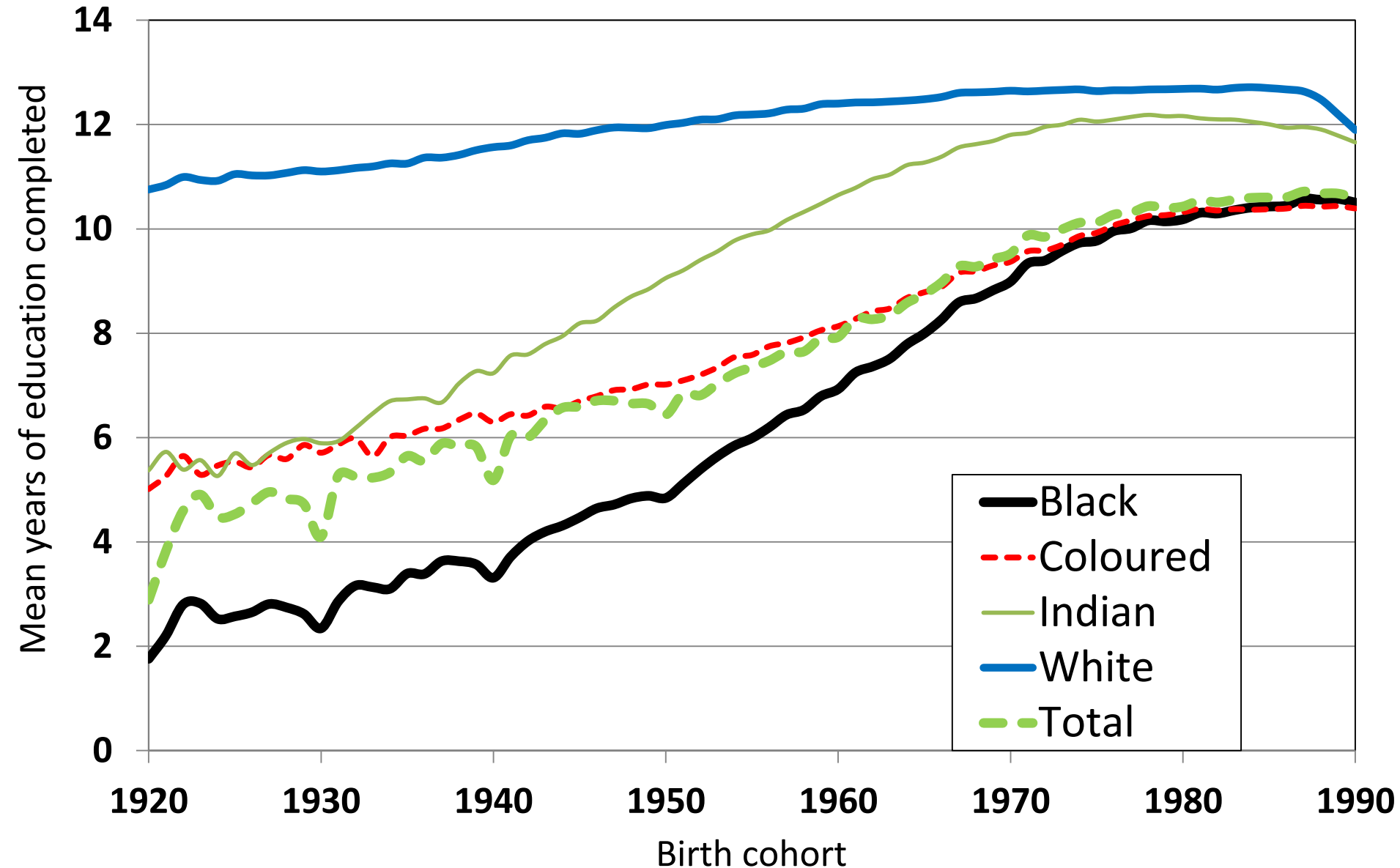- Transfers – slightly improve Gini (reduces poverty more)

Thus wage inequality sets a floor below the Gini

Income distribution will not substantially improve before wage inequality is reduced, through:
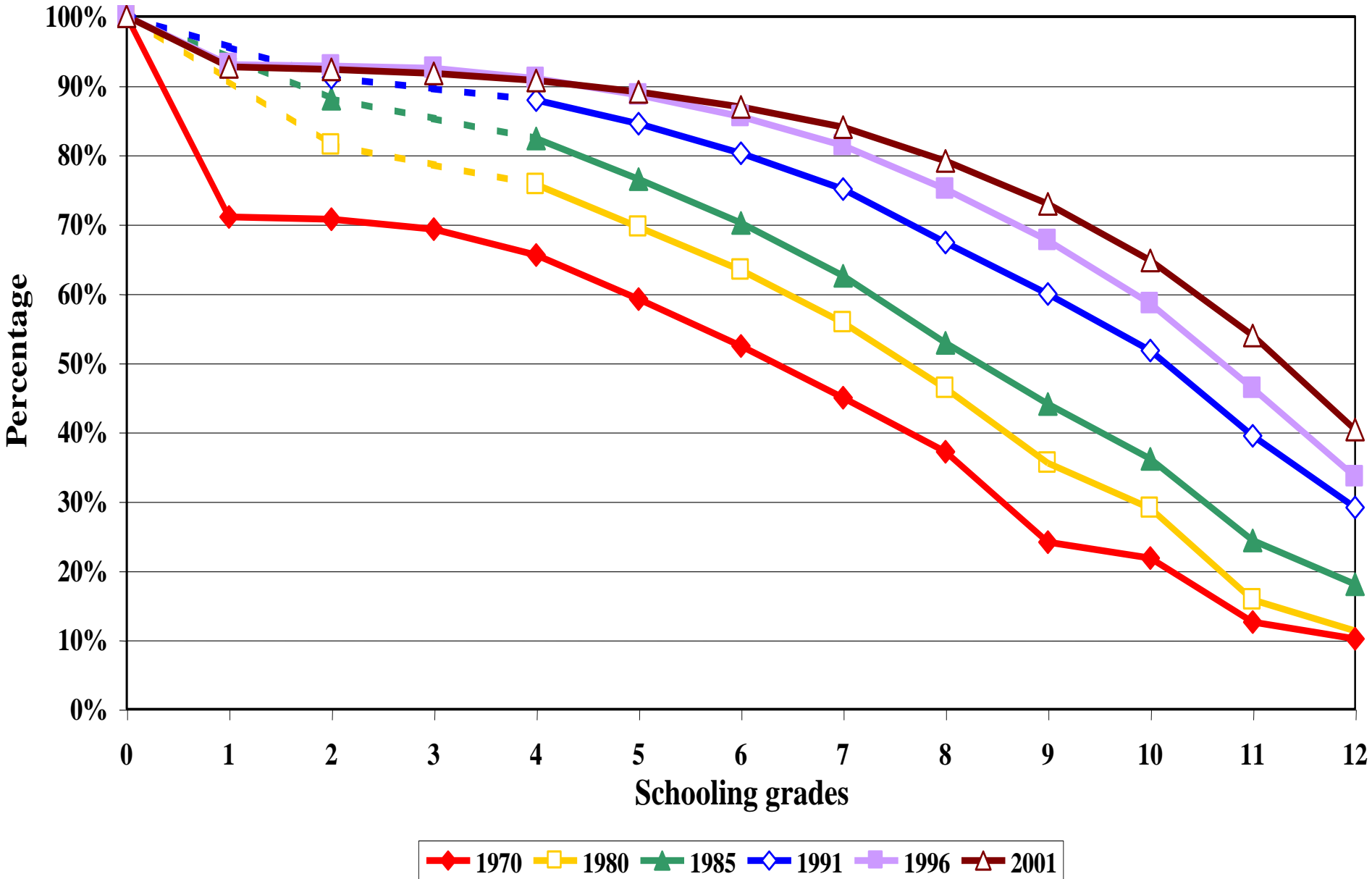
– Changes in educational attainment and quality

– Changes in returns to education

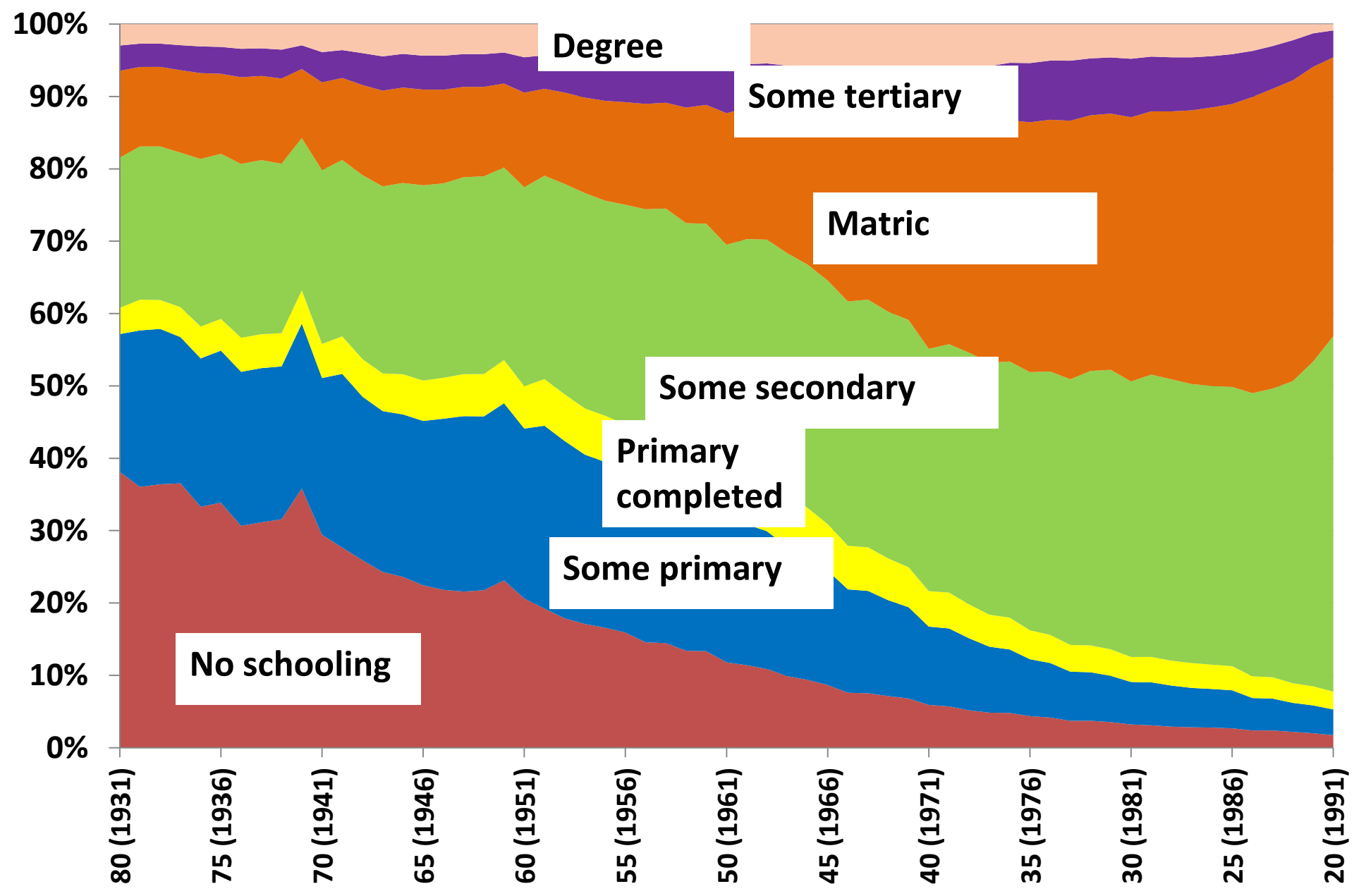# Mean years of education by race and birth cohort, 2011 (Source: Own calculations from Census 2011 (Supercross))
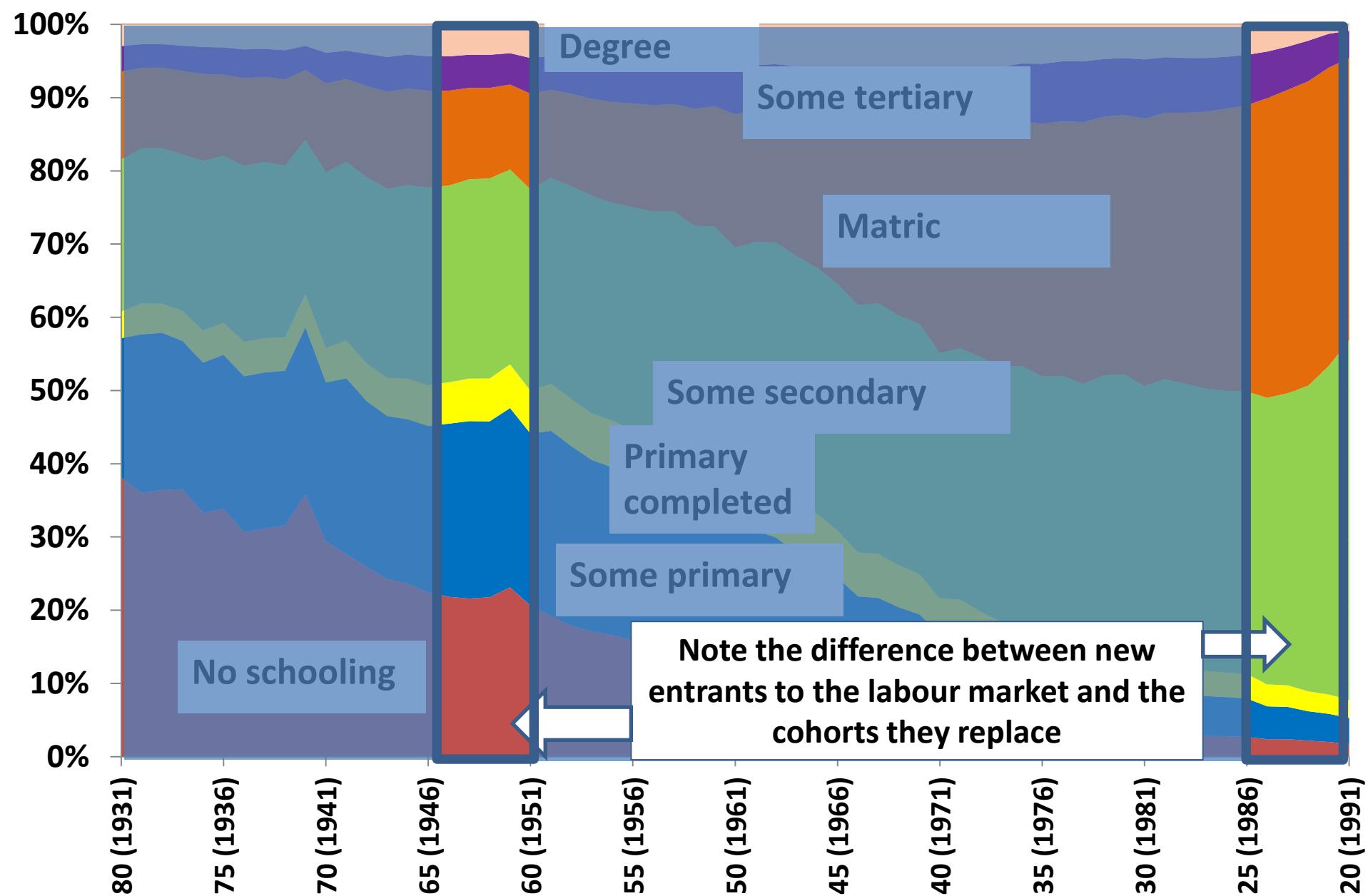
Attainment profiles of 21-25 year olds by census year

Schooling grades (x-axis), *Percentage* (y-axis)

Legend: 1970, 1980, 1985, 1991, 1996, 2001

Qualifications by age (birth cohort), 2011

Degree

Some tertiary

Matric

Some secondary

Primary completed

Some primary

No schooling

Note the difference between new entrants to the labour market and the cohorts they replace

80 (1931) | 75 (1936) | 70 (1941) | 65 (1946) | 60 (1951) | 55 (1956) | 50 (1961) | 45 (1966) | 40 (1971) | 35 (1976) | 30 (1981) | 25 (1986) | 20 (1991)

Matriculants by performance, 2010

	Blacks	Colou-reds	Indians	Whites	Total
Gr. 2s 1998	770 572	80 913	17 156	51 898	920 539
Matric 2010	465 728	39 374	13 216	41 091	559 409
Pass	233 973	27 557	10 113	24 936	233 973
Exemptions	64 355	8 149	6 118	17 414	96 036
Maths passes D+	28 889	2 785	4 587	13 954	50 215
A-aggregates	1 517	246	1 185	3 867	6 815

A white Gr.2 child is 7 times more likely to a obtain a Maths D+ than a black child, and 38 times as likely to achieve an A-aggregate

Years of education for two birth cohorts

Birth Cohort 1986
Birth cohort 1946
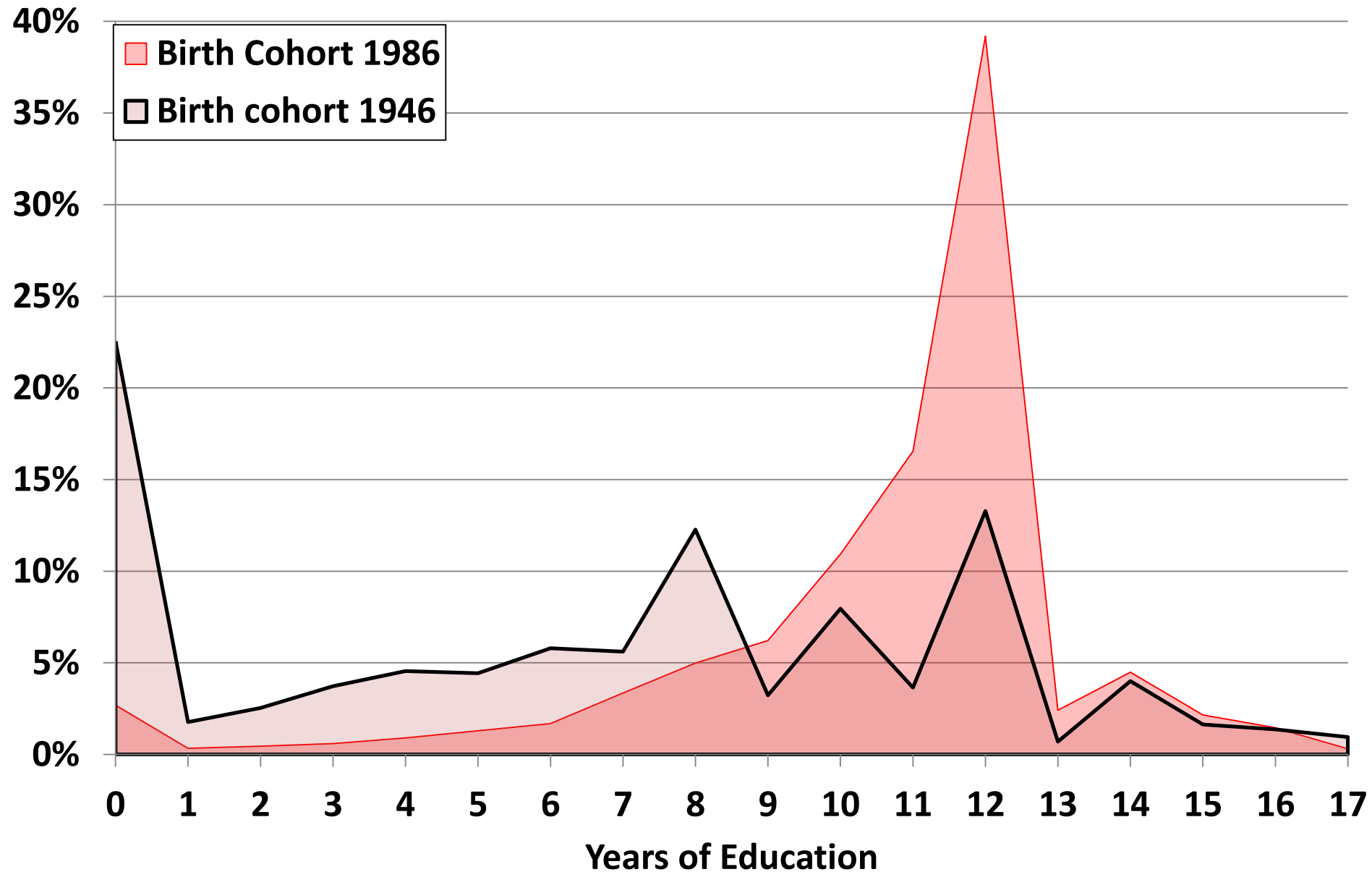
Years of Education

Quality of education in SA

- **Weak performance** even by African standards
  - and SA's poor perform worse than Africa's poor
- The school system has **two parts**, one functioning quite well, the other extremely weakly
  - This dangerously coincides with race and economic privilege
- **Resources bring little improvement** in weak schools, due to functionality and accountability issues
  - Thus resources are less important than the ability of schools to convert them into learning outcomes
   - **What would a weak school gain from having two more teachers?**

SA's school performance in international assessments has been exceedingly weak

This applies whether one considers literacy **performance compared to developed and middle income countries in Gr4 in PIRLS (SA tested in Gr5)**
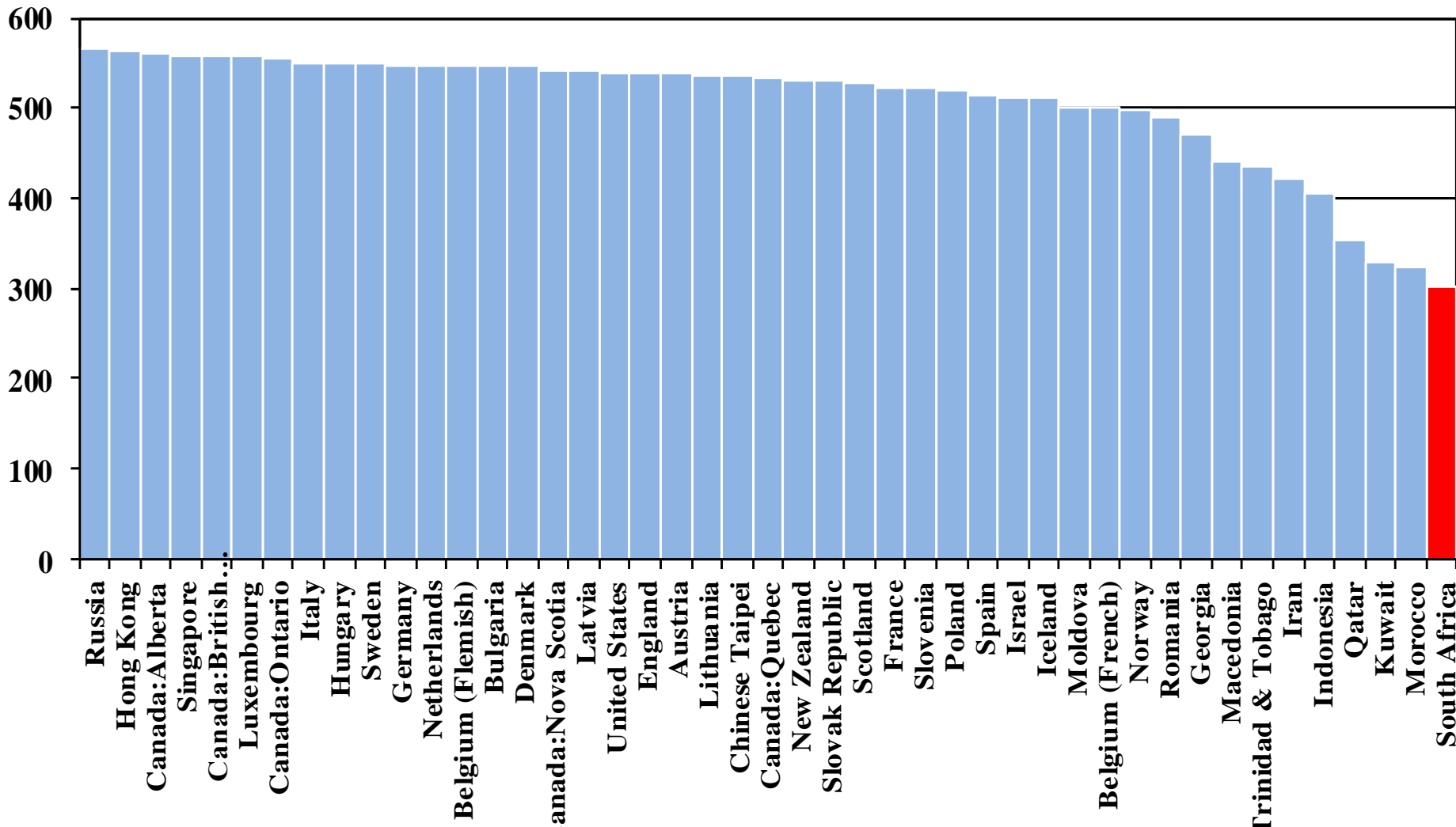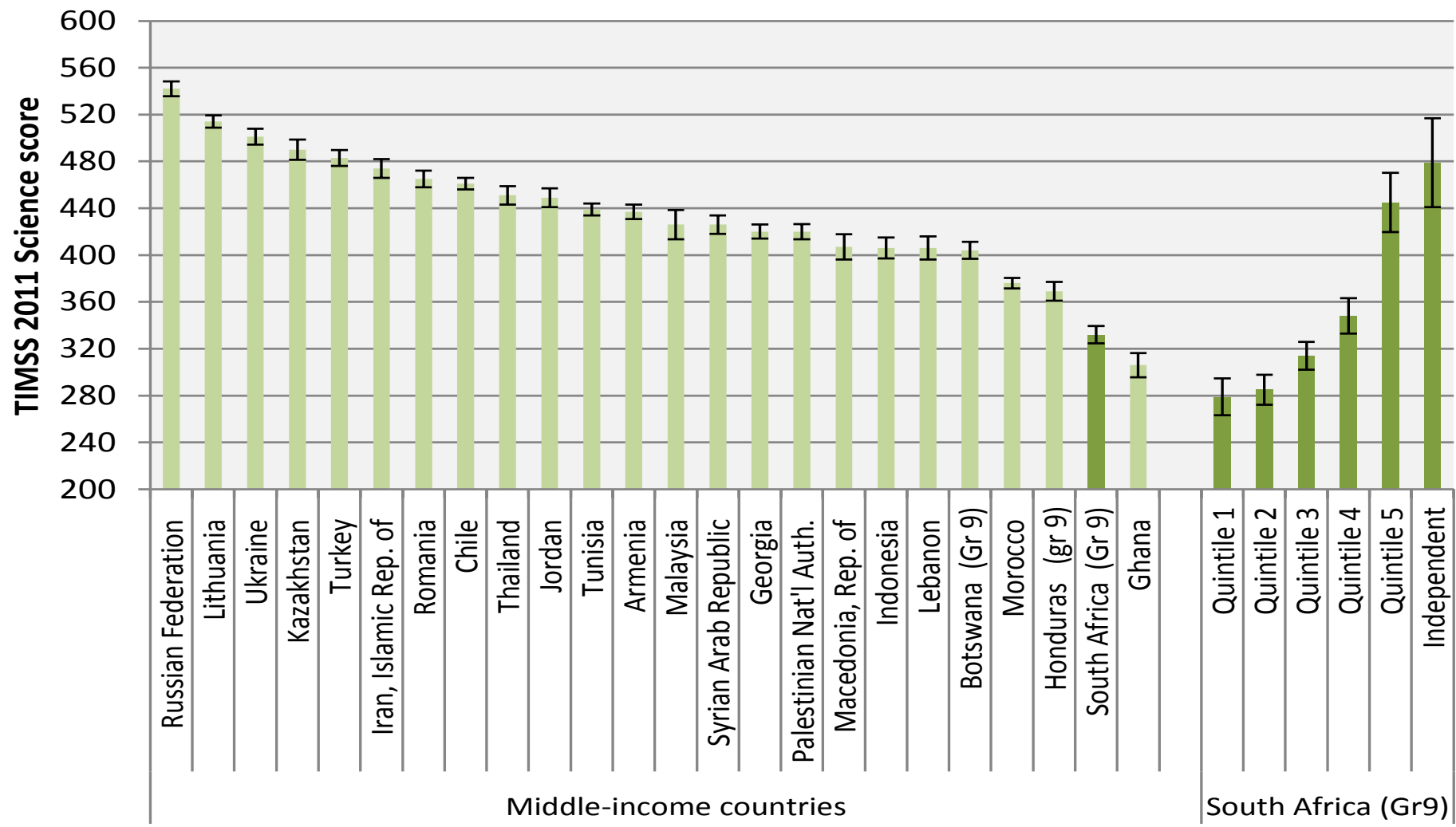
SA's school performance in international assessments has been exceedingly weak

...or <u>maths</u> performance compared to developed and middle income countries in Gr8 in TIMSS in 2011(SA tested in Gr9)

Mean across countries set to 500, standard deviation 100
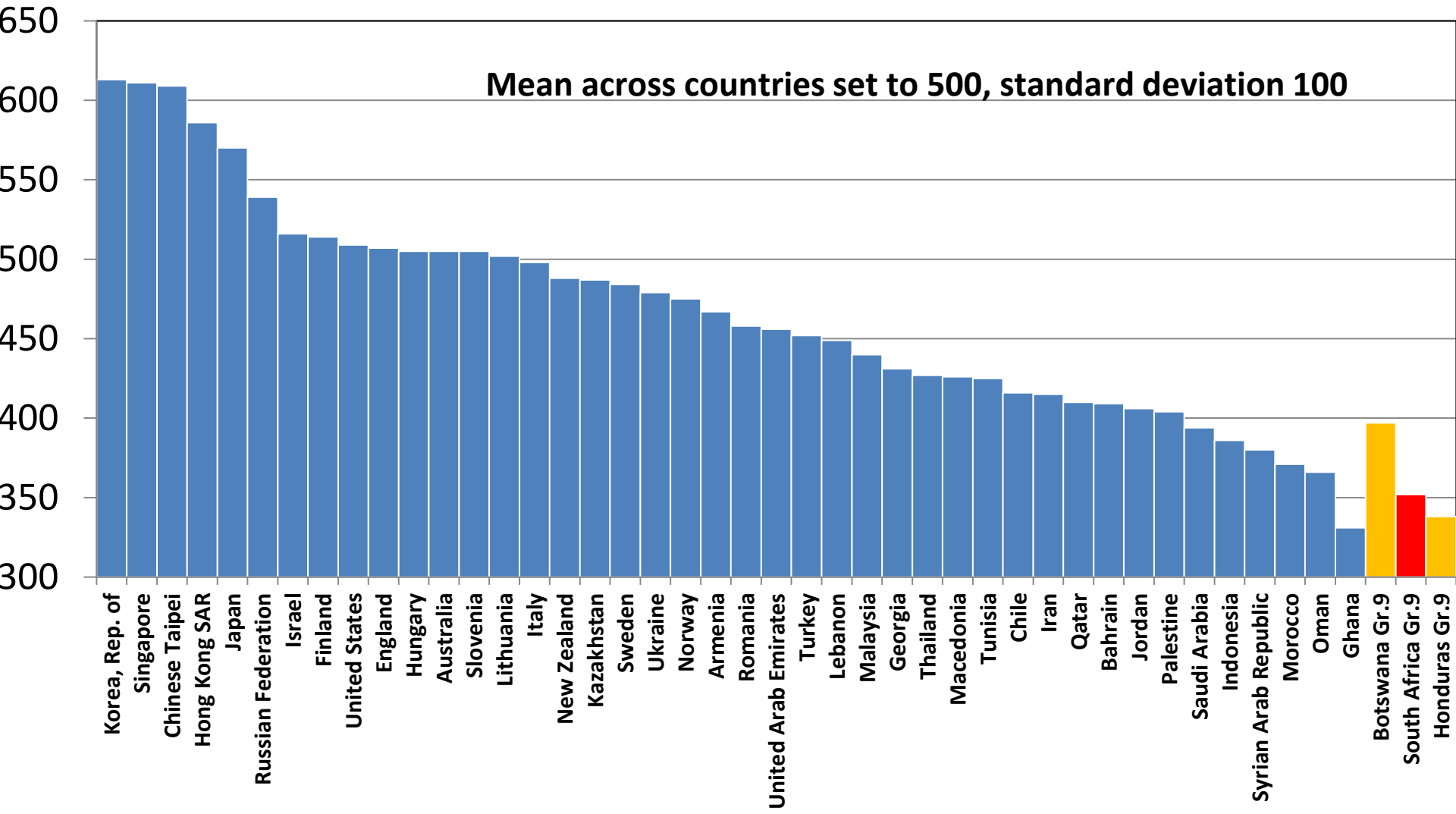
SA's school performance in international assessments has been exceedingly weak

...or <u>science</u> performance compared to middle income countries only in Gr8 in TIMSS in 2011(SA tested in Gr9)

SA's school performance in international assessments has been exceedingly weak

...or <u>reading</u> performance compared to southern and eastern African countries in Gr6 in SACMEQ III
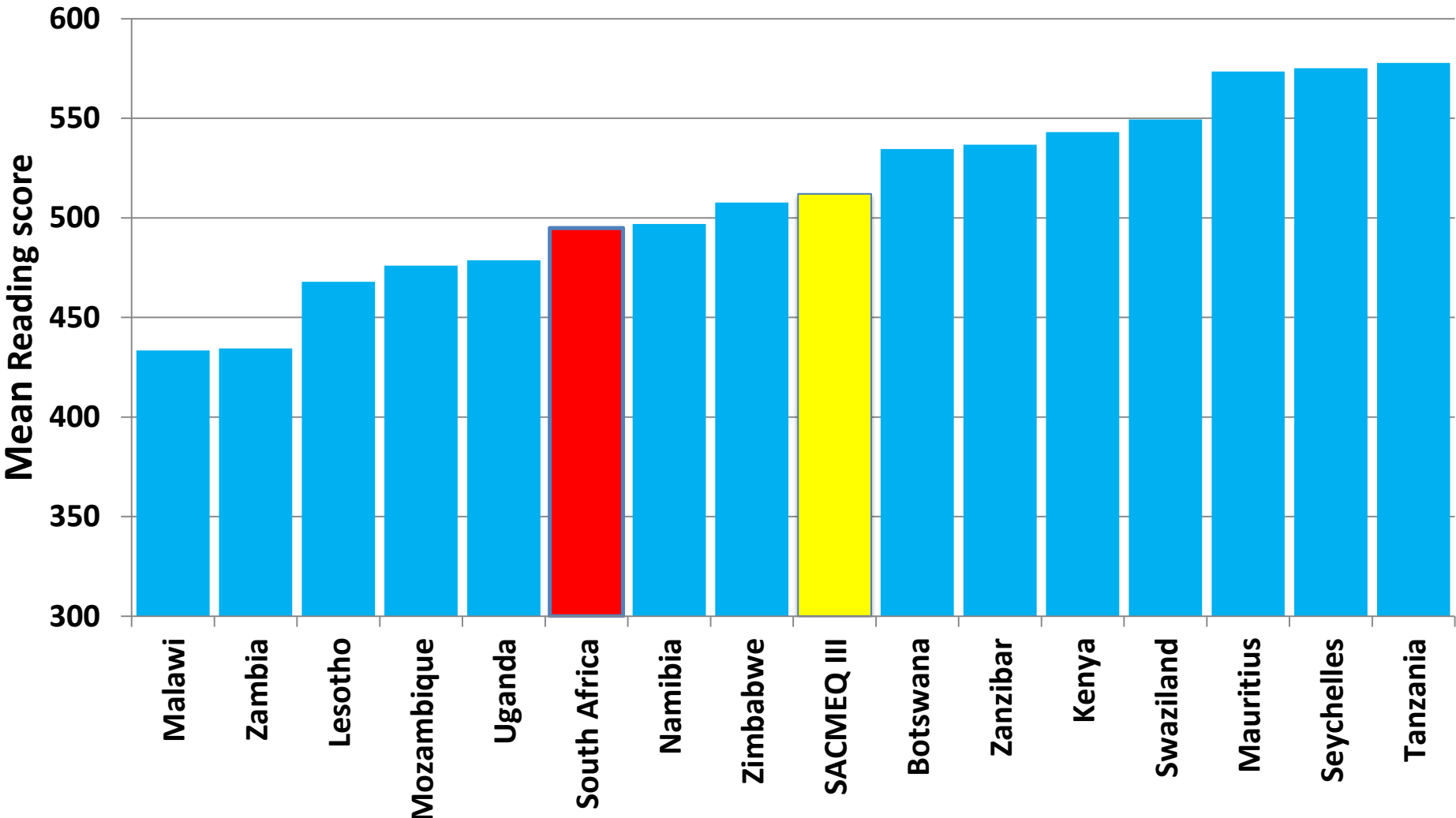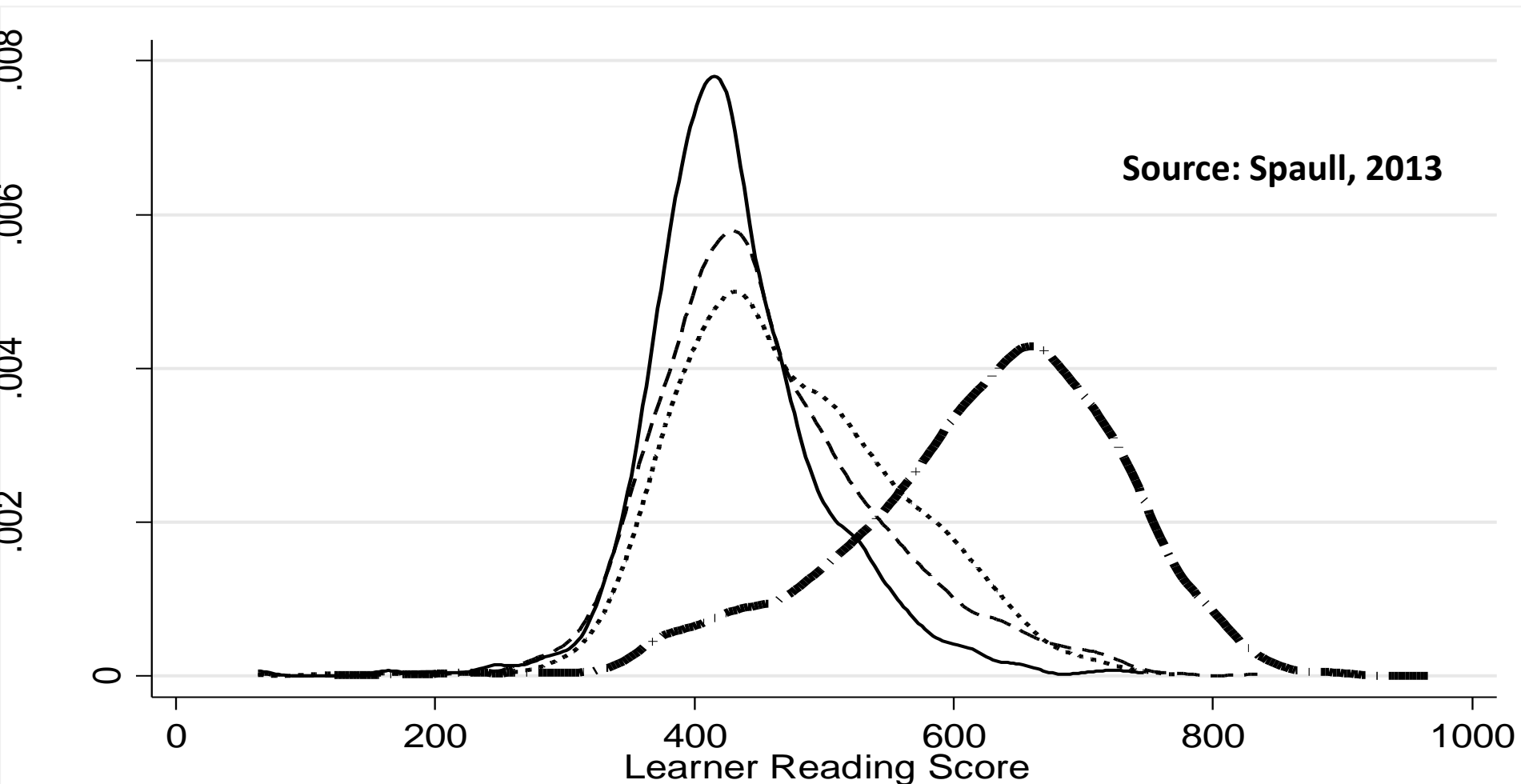
SA performance in SACMEQ perspective

- SA social gradient very steep – and lies above that for other SACMEQ countries

- Poor children in SA perform about half a stabdard deviation (around one year of learning) below similarly poor children in other SACMEQ countries

What education production functions tell

- Coleman report (1967) in USA raised the question, "Do schools matter?"
- Further questions have flowed from that
  - Do school resources matter?
  - Does teacher quality matter?
  - What factors influence learning outcomes?
- Generally, the answer appears to be that these things **could** matter, but seldom do matter
- That raises issues of **x-efficiency, principal-agent** issues, **accountability** structures, information **asymmetries** and **feedback** loops
- In SA, policy thinking has in addition also considered school functionality and teacher effort
- Banerjee & Duflo (2011), Pritchett & Beatty (2012) and others have raised the issue of **misaligment of the curriculum** with the cognitive levels learners have achieved

SACMEQ III (2007) student reading scores by quartiles of school SES

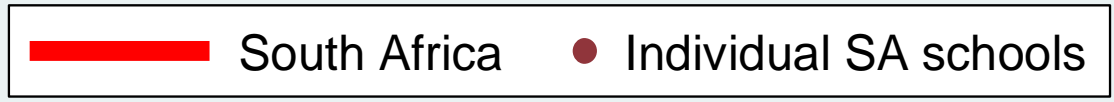Source: Spaull, 2013

Learner Reading Score

| —— Poorest 25% | – – – Second poorest 25% |
| ·········· Second wealthiest 25% | –·–·– Wealthiest 25% |

Maths Score and School SES

Individual schools and SA trendline

South Africa — Individual SA schools

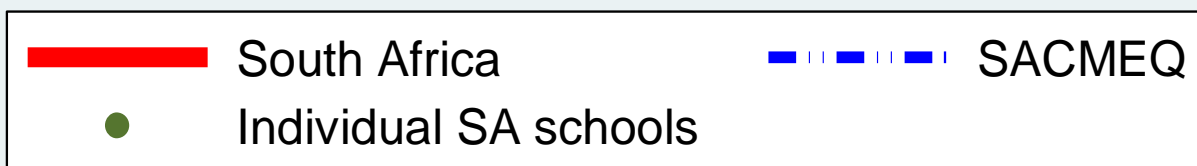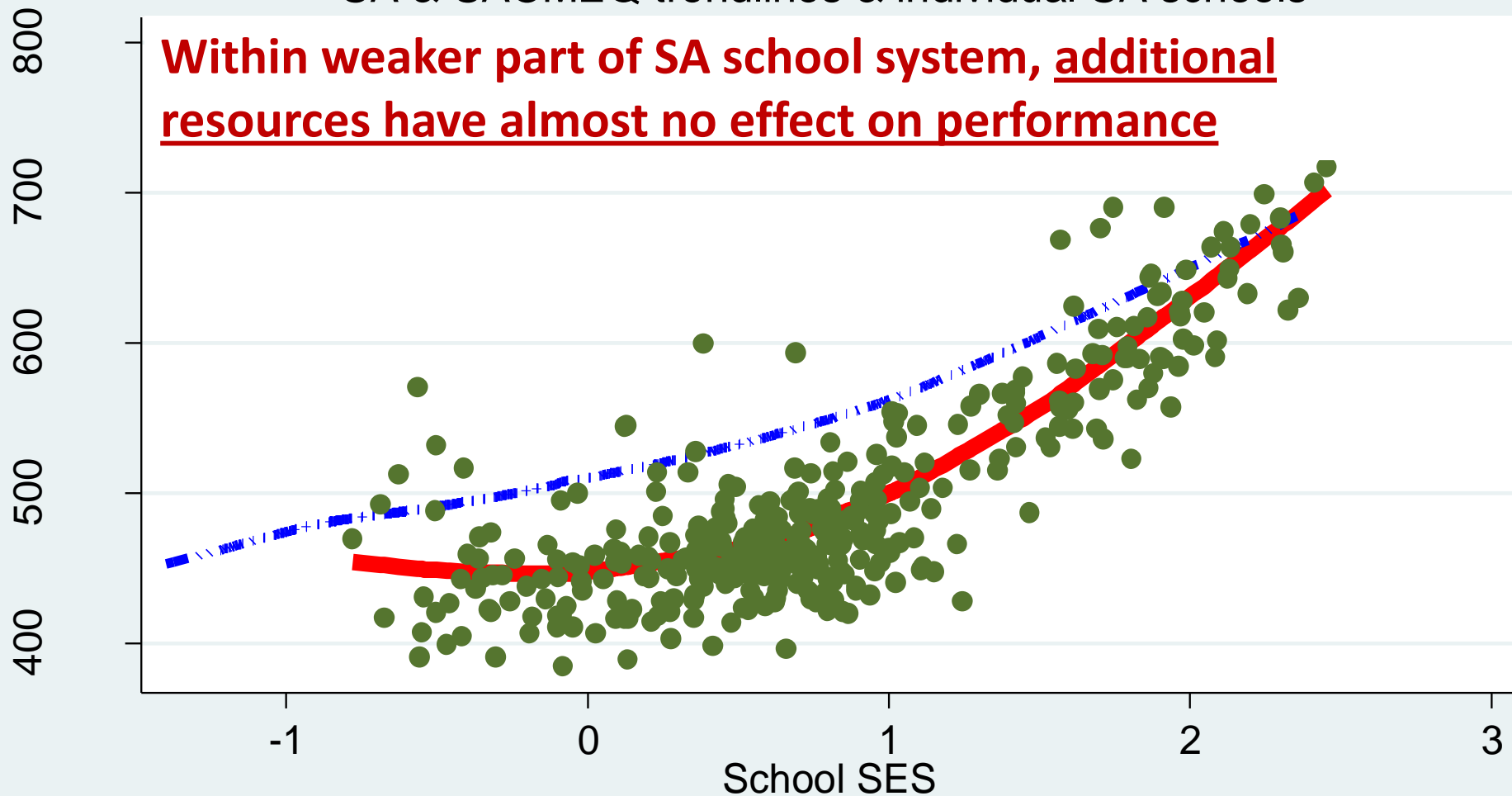Maths Score and School SES

SA vs SACMEQ
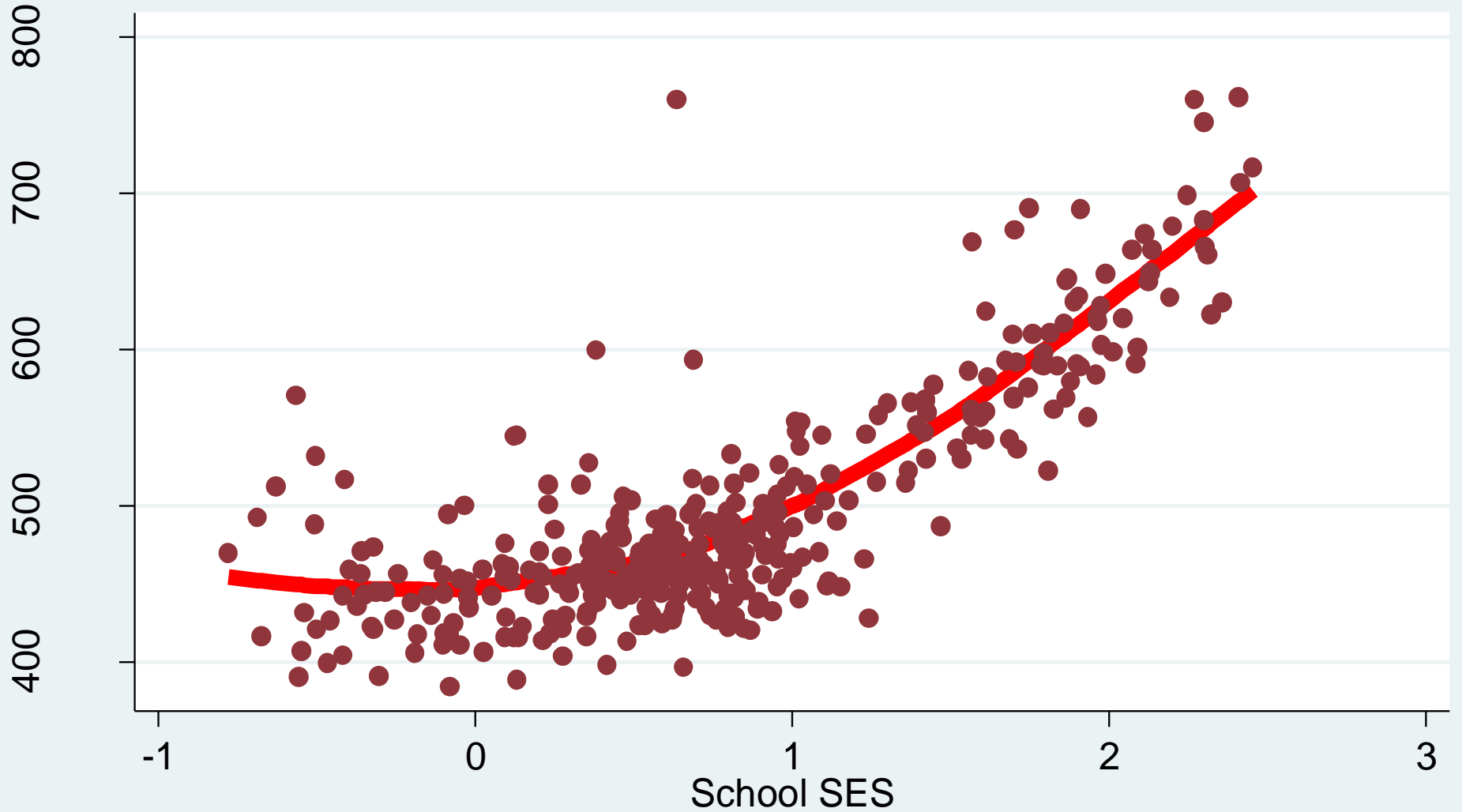
Maths Score and School SES
SA & SACMEQ trendlines & individual SA schools

Within weaker part of SA school system, <u>additional resources have almost no effect on performance</u>

Legend:
- **South Africa** (red solid line)
- **SACMEQ** (blue dash-dot line)
- **Individual SA schools** (green dots)

x-axis: School SES

Mathematics performance by pupil SES:
Contrasting affluent schools with others

Note: Only the most affluent three-quarters of quintile 5 pupils and the poorest three-quarters of other quintiles are shown

Pupil SES

Top quintile of schools   Other schools
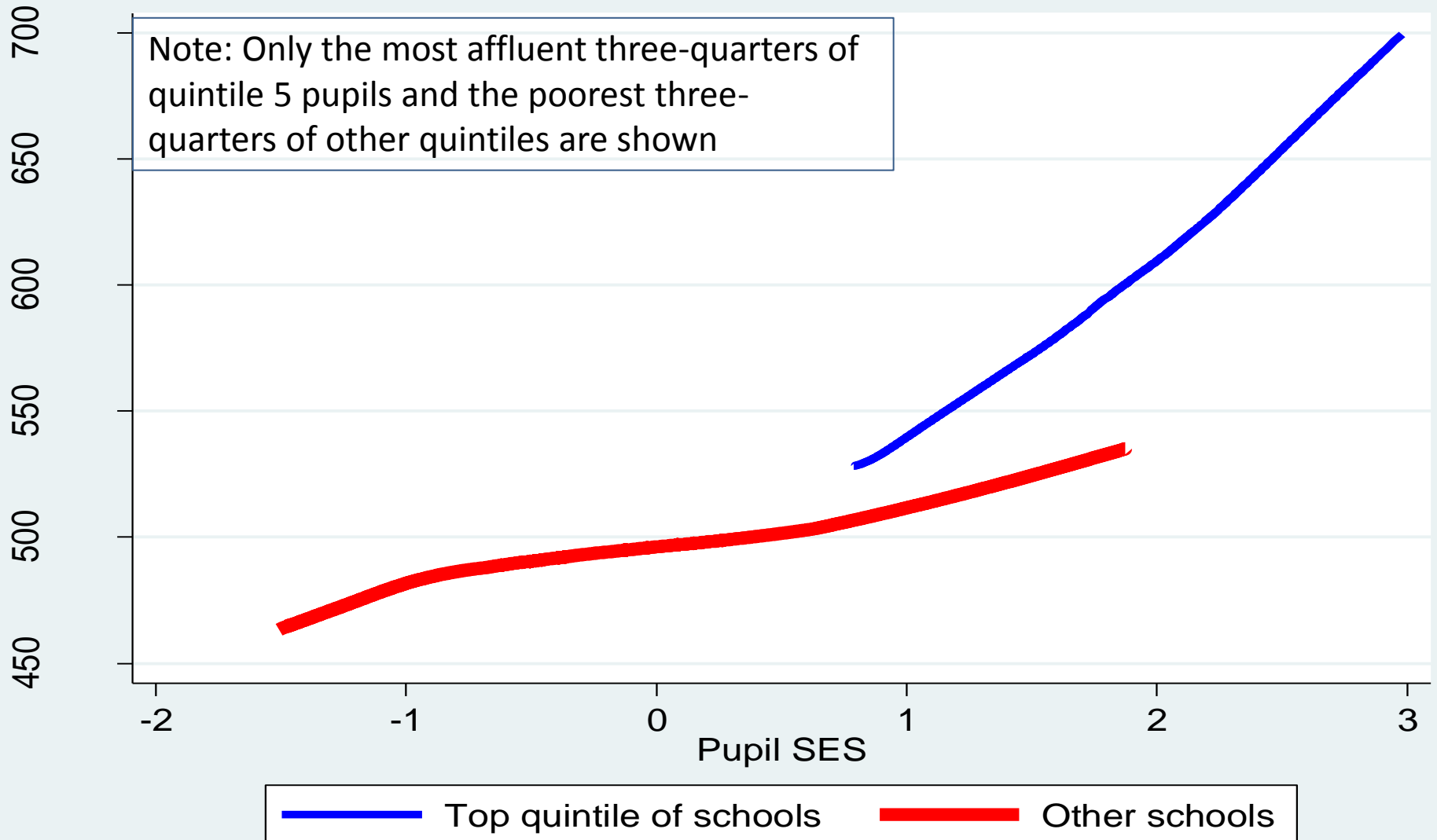
For many, maths learning stops before simple subtraction is mastered…

Only 24% of South African **Grade 5** children can answer this Grade 2 level question

> **Pam has R40.**
>
> **She spends R28.**
>
> **How much money does she have left?**

Is language perhaps the barrier?

Then how can only explain that only 14% of **Grade 5**s could answer this Grade 3-level question?

$$
\begin{array}{r}
105 \\
-\ \ 7 \\
\hline
\end{array}
$$

Source: Janeli Viljoen, 2013 (unpublished)

How weak is teacher subject knowledge?

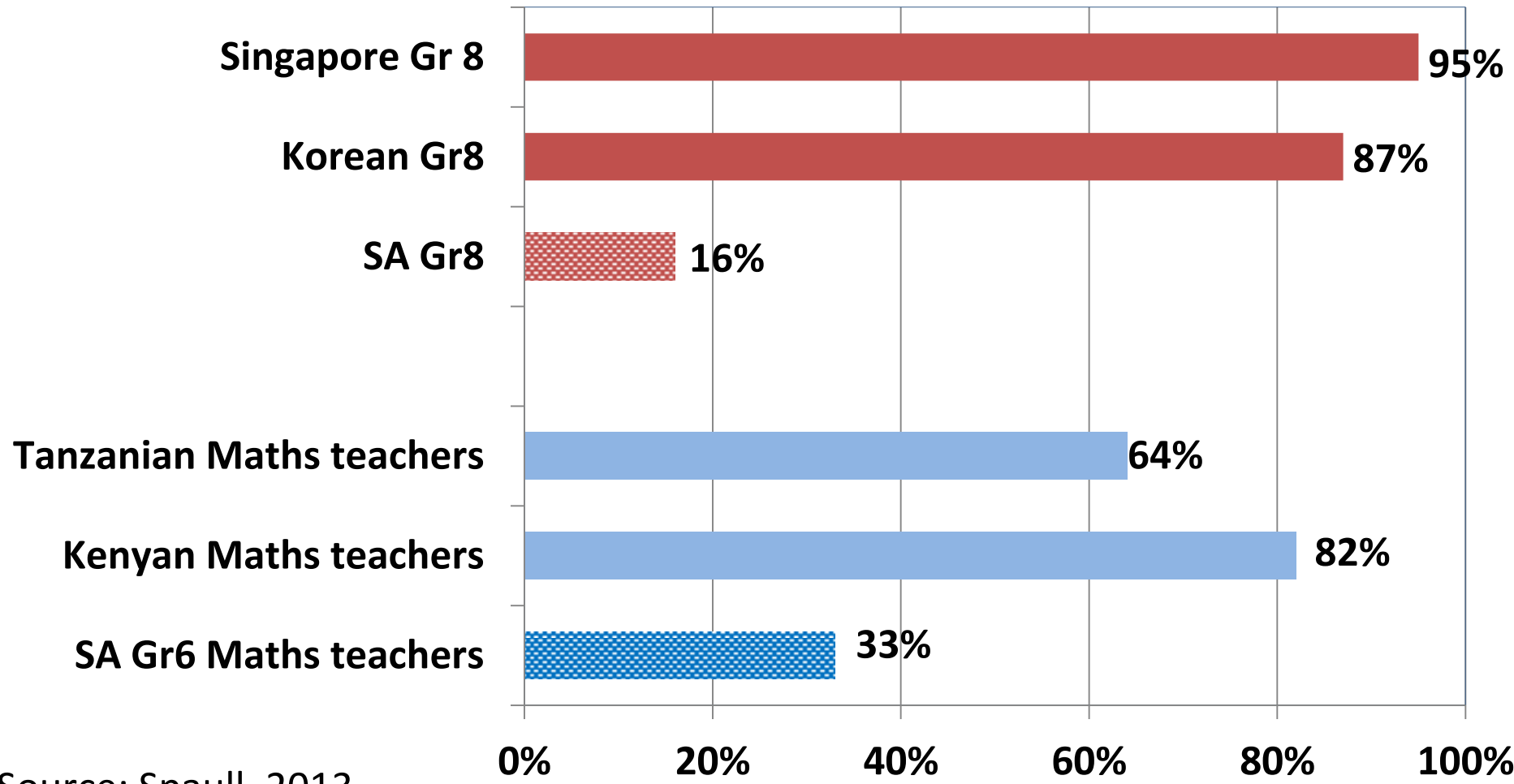If the height of a fence is raised from 60 cm to 75 cm, what is the percentage increase in height?

A. ☐ 15 percent

B. ☐ 20 percent

C. ☐ 25 percent

D. ☐ 30 percent

- **Most SA Gr6 Maths teachers (57%) thought the answer was 15 per cent** (indicating they can subtract)
- Only 24% gave the correct answer

Performance on common question in SACMEQ III Gr6 teacher tests and TIMSS 1995 Gr8 student test: (well within Gr6 curriculum)

"To mix a certain colour of paint, Enni combines 5 litres of red paint, 2 litres of blue paint, and 2 litres of yellow paint. What is the ratio of red paint to the total amount of paint?" a) 5:2   b) 5:4   **c) 5:9**   d) 9:4

Category	Value
Singapore Gr 8	95%
Korean Gr8	87%
SA Gr8	16%
Tanzanian Maths teachers	64%
Kenyan Maths teachers	82%
SA Gr6 Maths teachers	33%

Source: Spaull, 2013

Effort/coverage/opportunity to learn

- By September/October 2009, the NSES study found that
  - One-third of SA grade 5 children had not **written** a single paragraph-length piece during that whole school year
  - Another quarter had written only one or two short paragraphs
  - Only 7% had written 10 or more paragraphs
  - 40% had done fewer than 5 "**complex calculations**" in their books (defined as more than one step)

Conclusion

- **Labour market inequality** is central to overall inequality and to poverty

- Central to equity in the labour market, to poverty reduction and to income distribution is **educational quality**
  - though there are long lags involved

- Educational quality for all is thus the central national equity concern

- Research and practice show that resource equity is a necessary, but far from sufficient, condition for equity of educational outcomes

Retrospect and prospect

- The strength and convexity of the two regularities discussed – returns to education and social gradients in education – point to deep roots to SA income inequality and to poverty
- Inequality cannot be reduced fundamentally and lastingly without a good education for the bulk of the population
  - This we have thus far failed to do, not because of a lack of money
- Only good education can reduce the slope of both curves
  - directly in education
  - by reducing the wage premium through reducing the skills constraint in the labour market
- Thus the root causes of poverty will remain in place for decades
- The best we can do for the poor in the meantime is to
  - continue (within fiscal constraints) with the social grant system
  - improve delivery of social services
  - create conditions for economic growth to flourish