

Early educational inequalities and the impact of Grade R

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Introduction

- Low and unequal educational outcomes early on.
- Little evidence of narrowing of these gaps
- Not unique to South Africa
 - “Inequality at the Starting Gate” (Lee and Burkham, 2002)
 - (Feinstein, 2003, Heckman, 2006)
- Heckman (2006: 1901):

“the mastery of skills that are essential for economic success and the development of their underlying neural pathways follow hierarchical rules. Later attainments build on foundations that are laid down earlier.”



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Introduction

- Therefore, intervene early!
- E.g. Improve pre-school exposure
- Attending pre-school can produce educational benefits that persist at least several years into schooling (e.g. Sammons *et al*, 2004).



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Learning gaps in South Africa



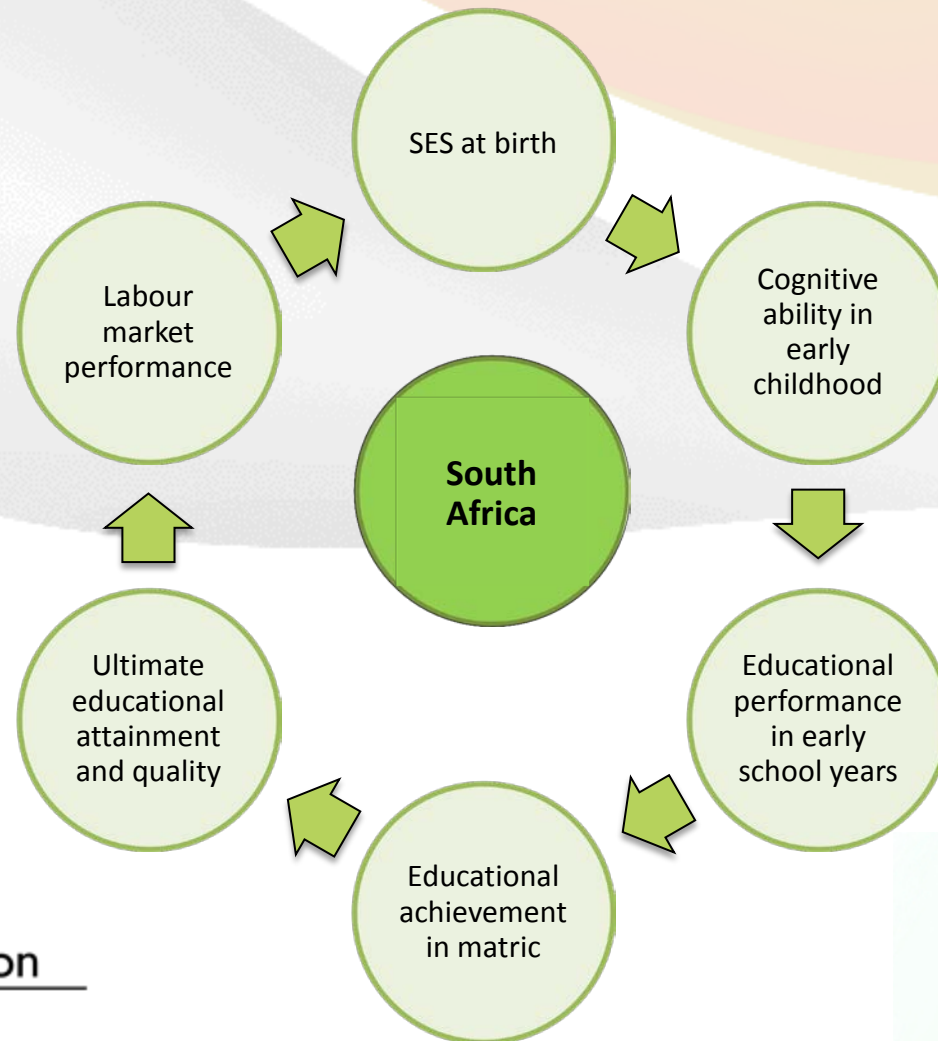
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School Systems:

Instruments of Transformation or Reproduction?



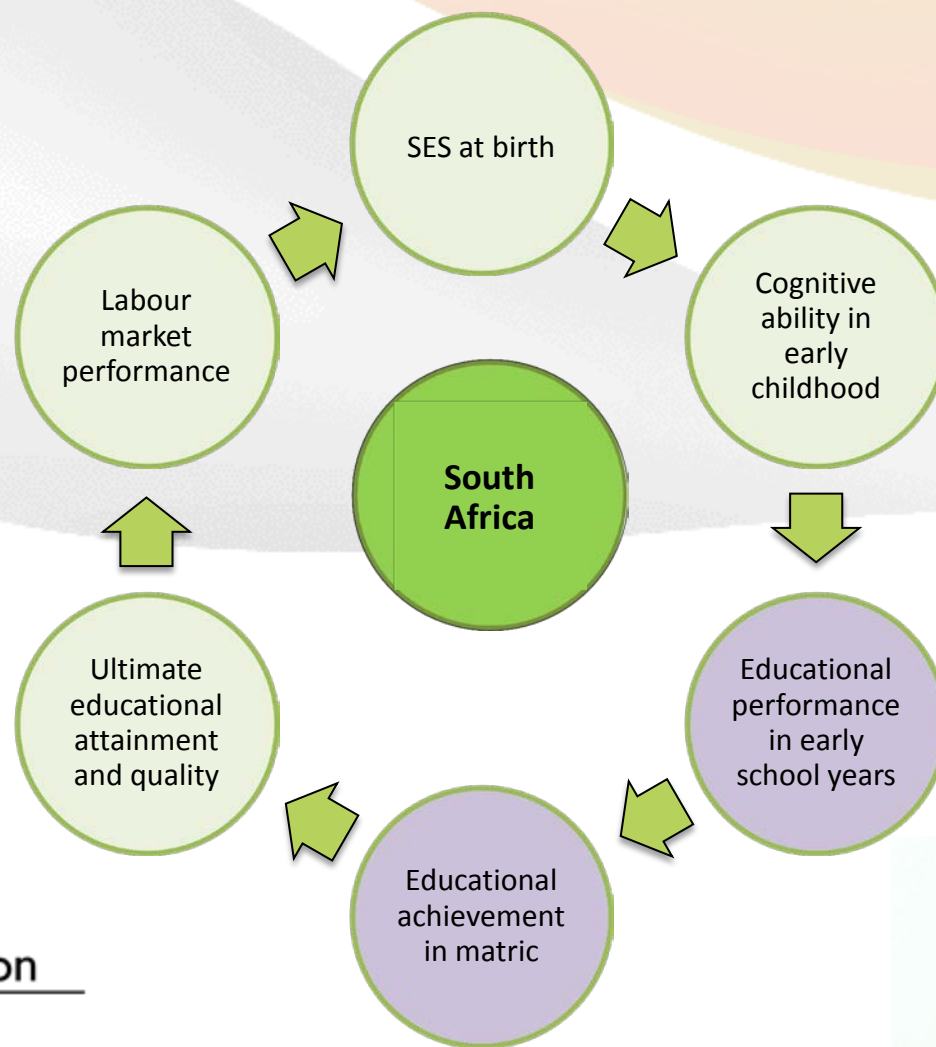
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School Systems:

Instruments of Transformation or Reproduction?



The school system represents a mediating layer influencing the intergenerational transmission of SES

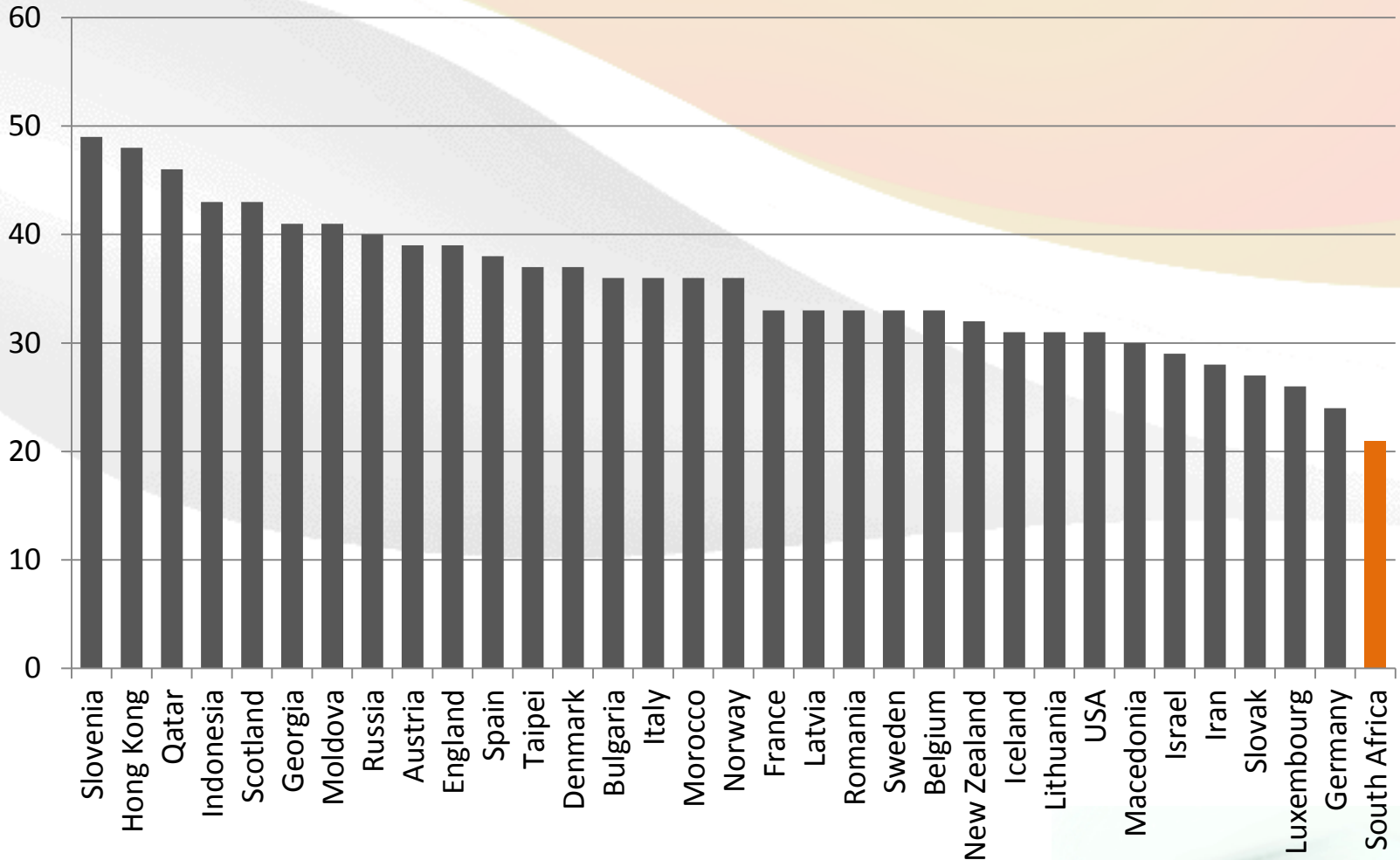


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Transformation or Reproduction?

Percentage of the poorest 20% of learners that achieve above the national average



Source: PIRLS data



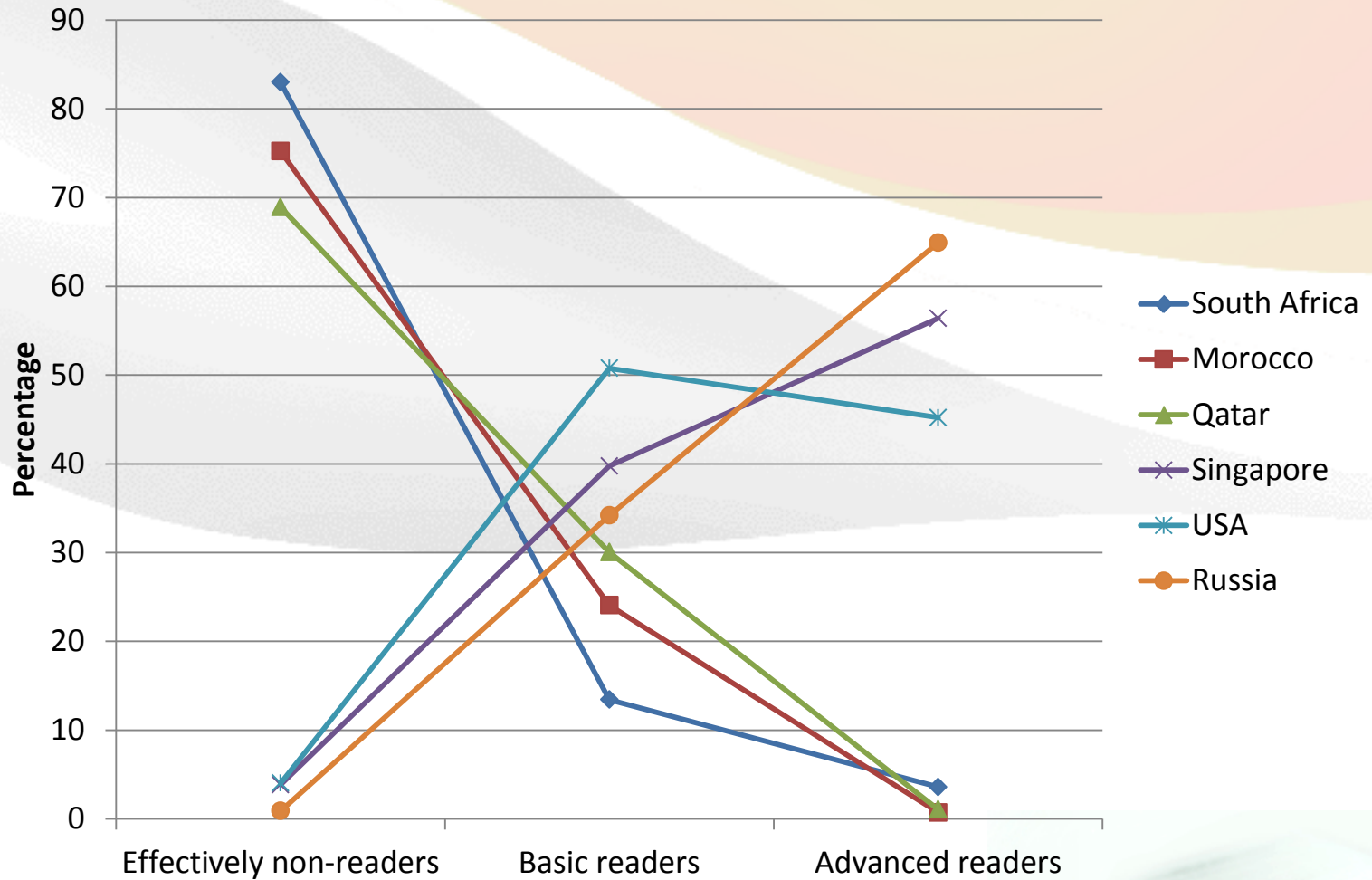
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Massive deficits early in primary school

Proportions of the grade 4 (5) children at various levels of reading competency



Source: PIRLS data



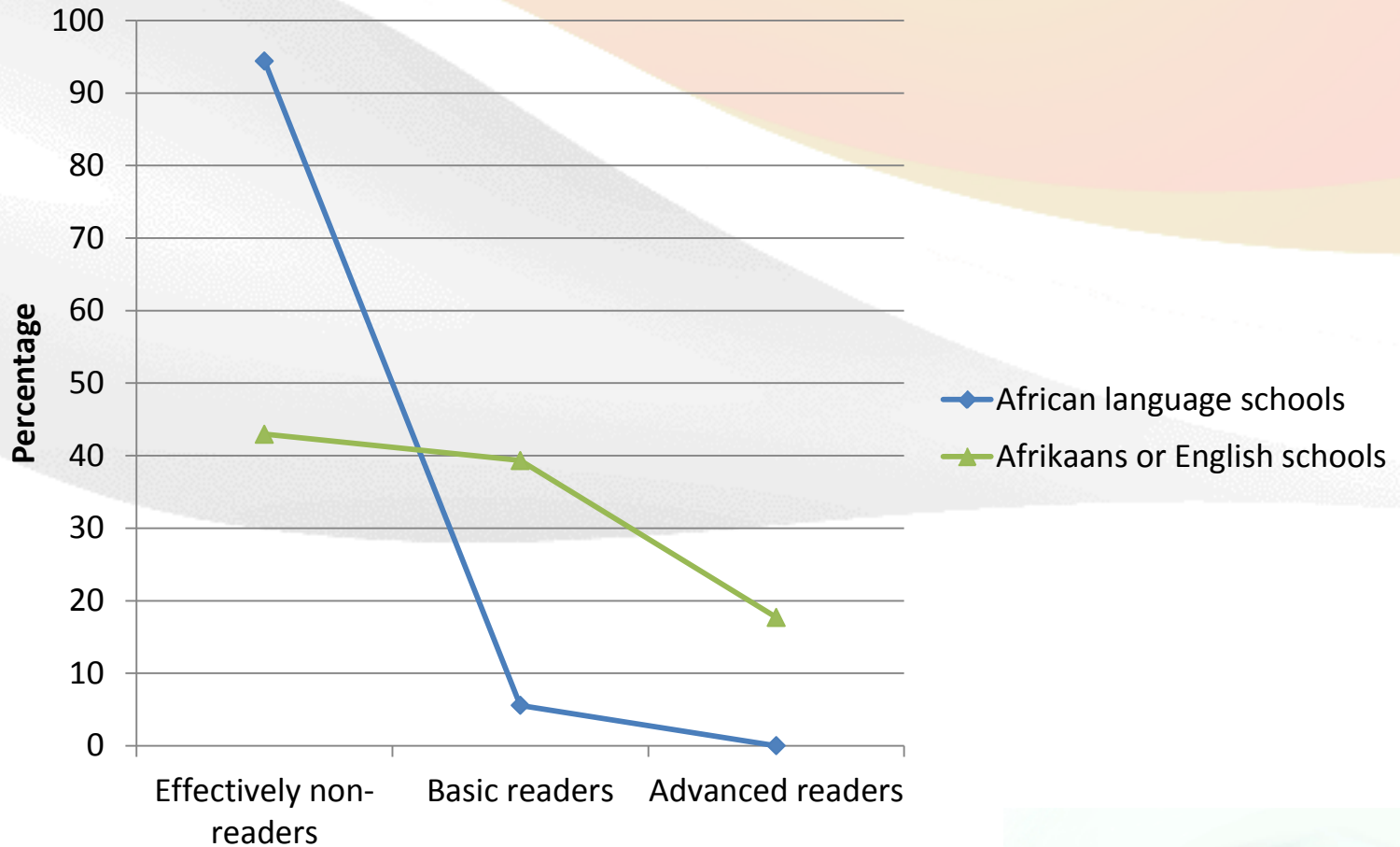
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Massive deficits early in primary school

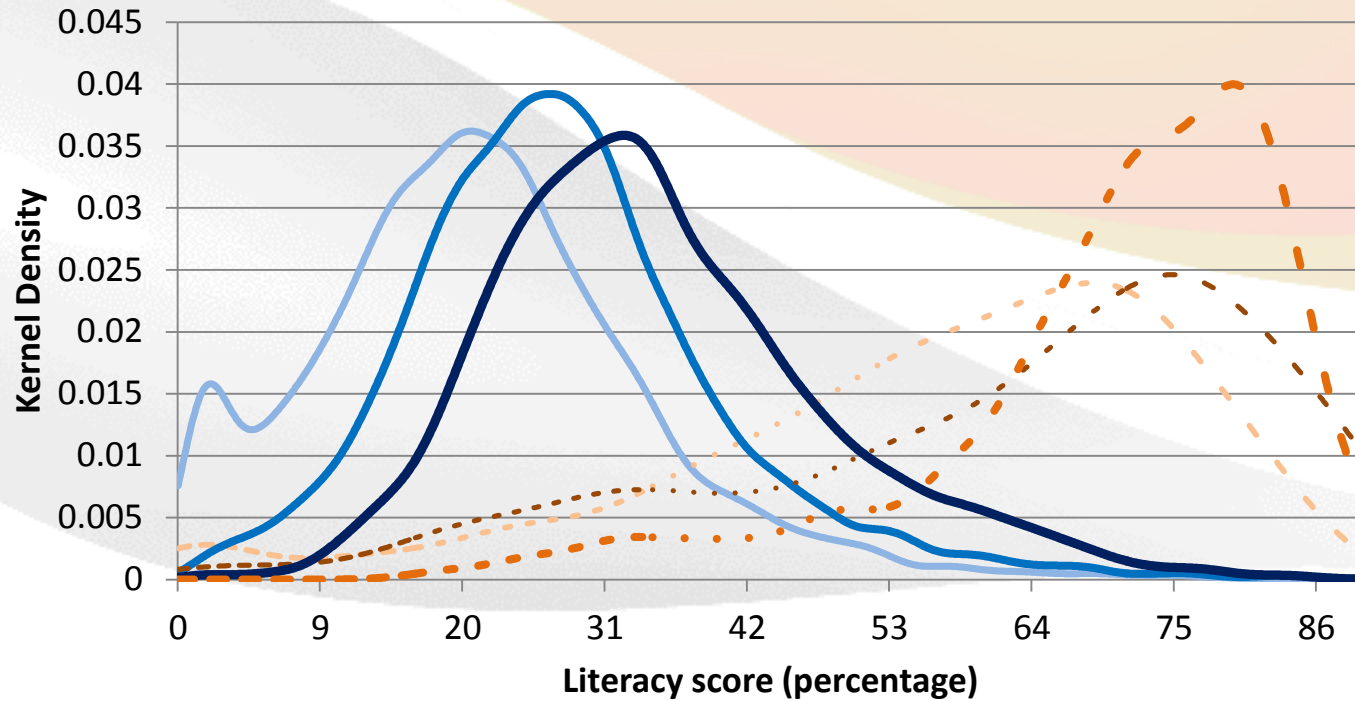
Proportions of the grade 5 children at various levels of reading competency



Source: PIRLS data



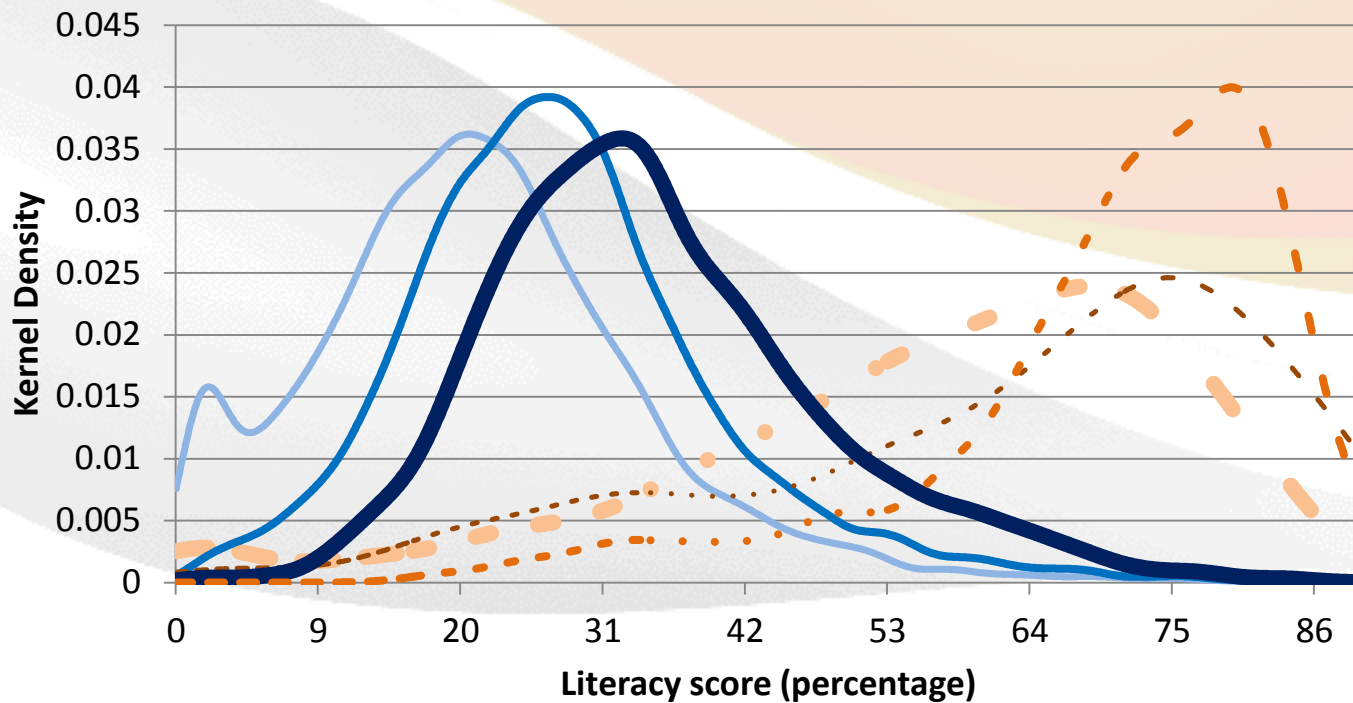
Massive deficits early in primary school



- Historically black grade 3
- Historically white grade 3
- Historically black grade 4
- Historically white grade 4
- Historically black grade 5
- Historically white grade 5



Massive deficits early in primary school

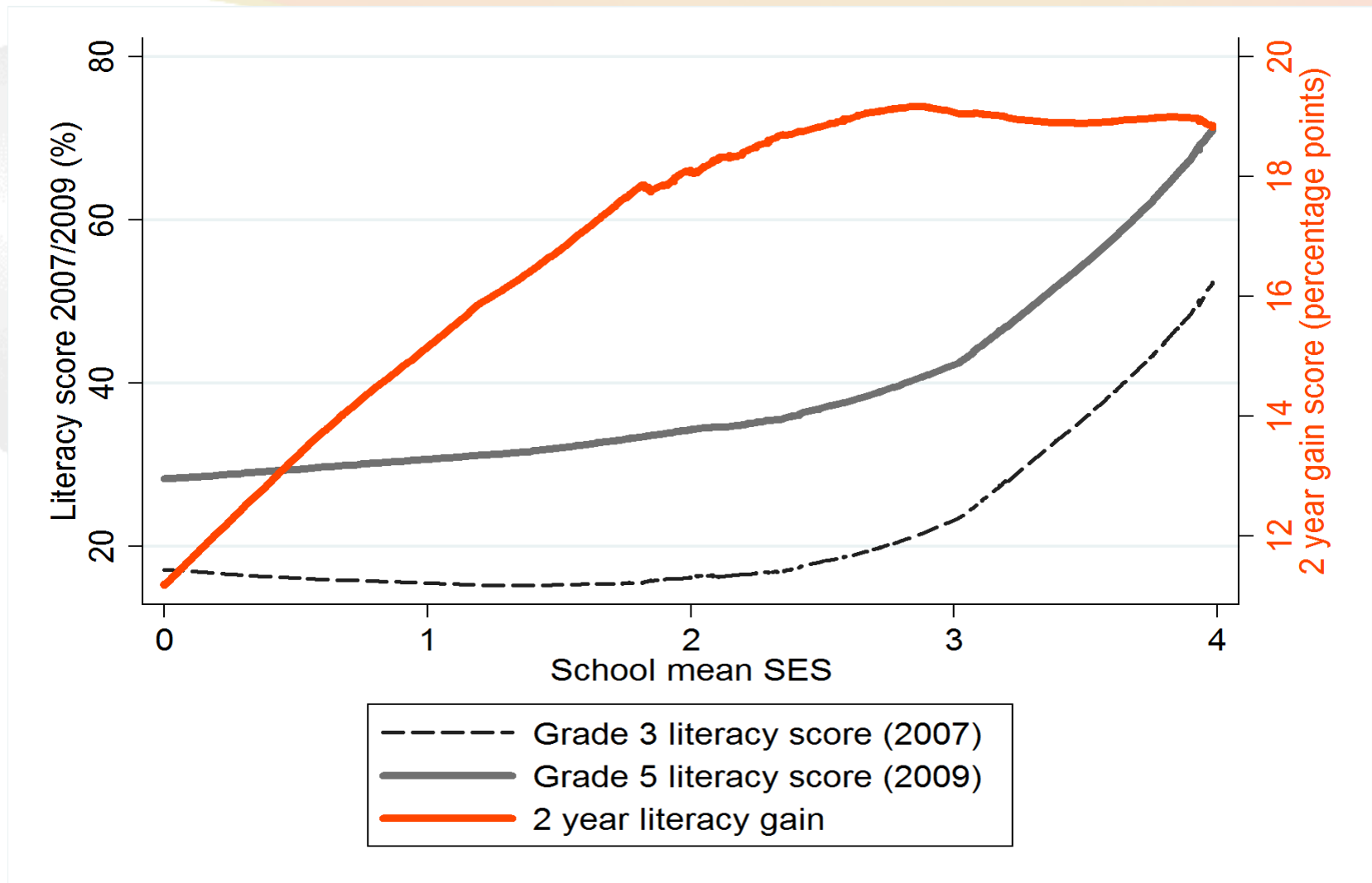


- Historically black grade 3
- Historically white grade 3
- Historically black grade 4
- Historically white grade 4
- Historically black grade 5
- Historically white grade 5

Source: NSES data



Divergence in the relative performance of rich and poor children



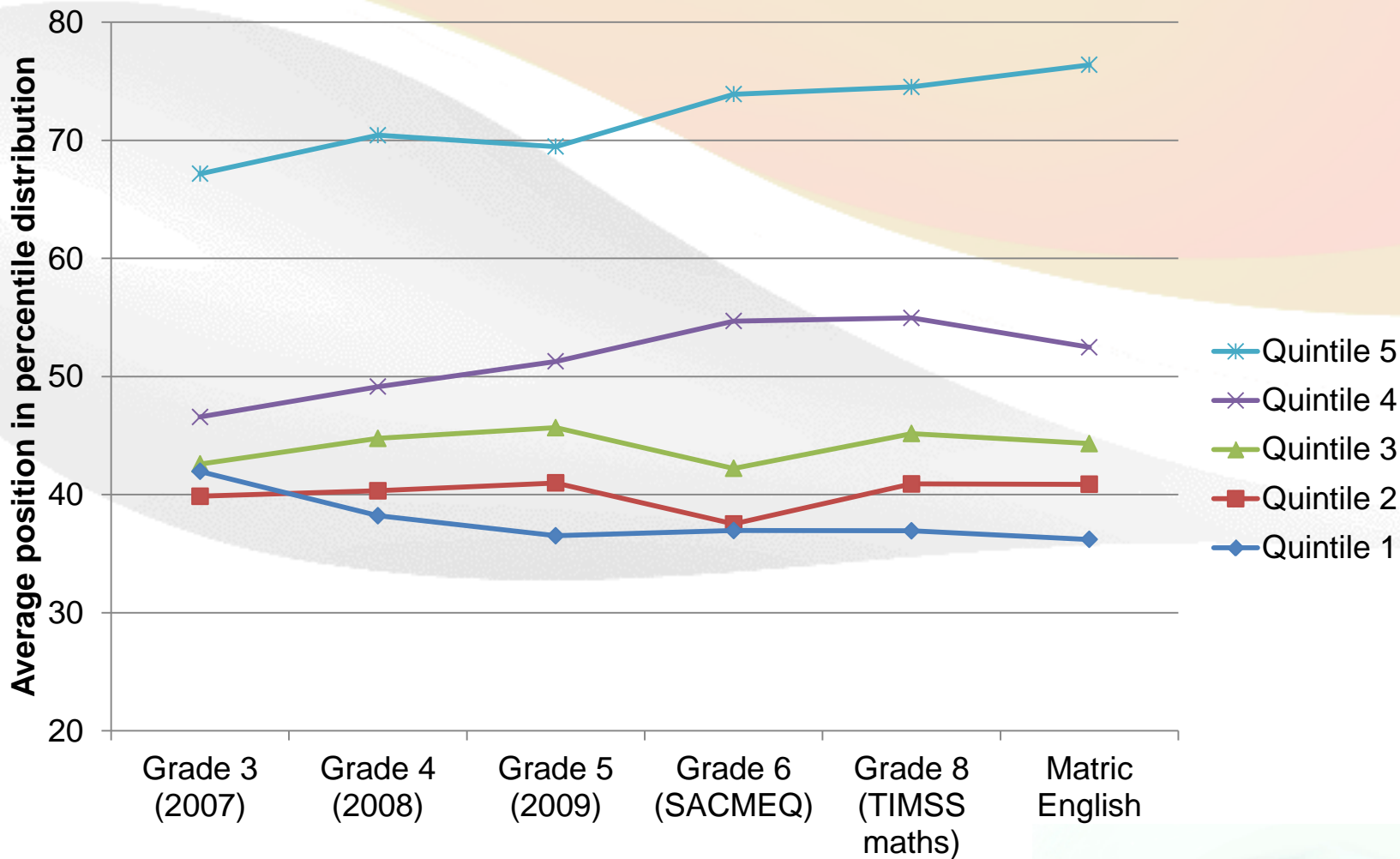
Source: NSES data



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Divergence in the relative performance of rich and poor children



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Source: NSES, SACMEQ, TIMSS, MATRIC



Expanding access to Grade R

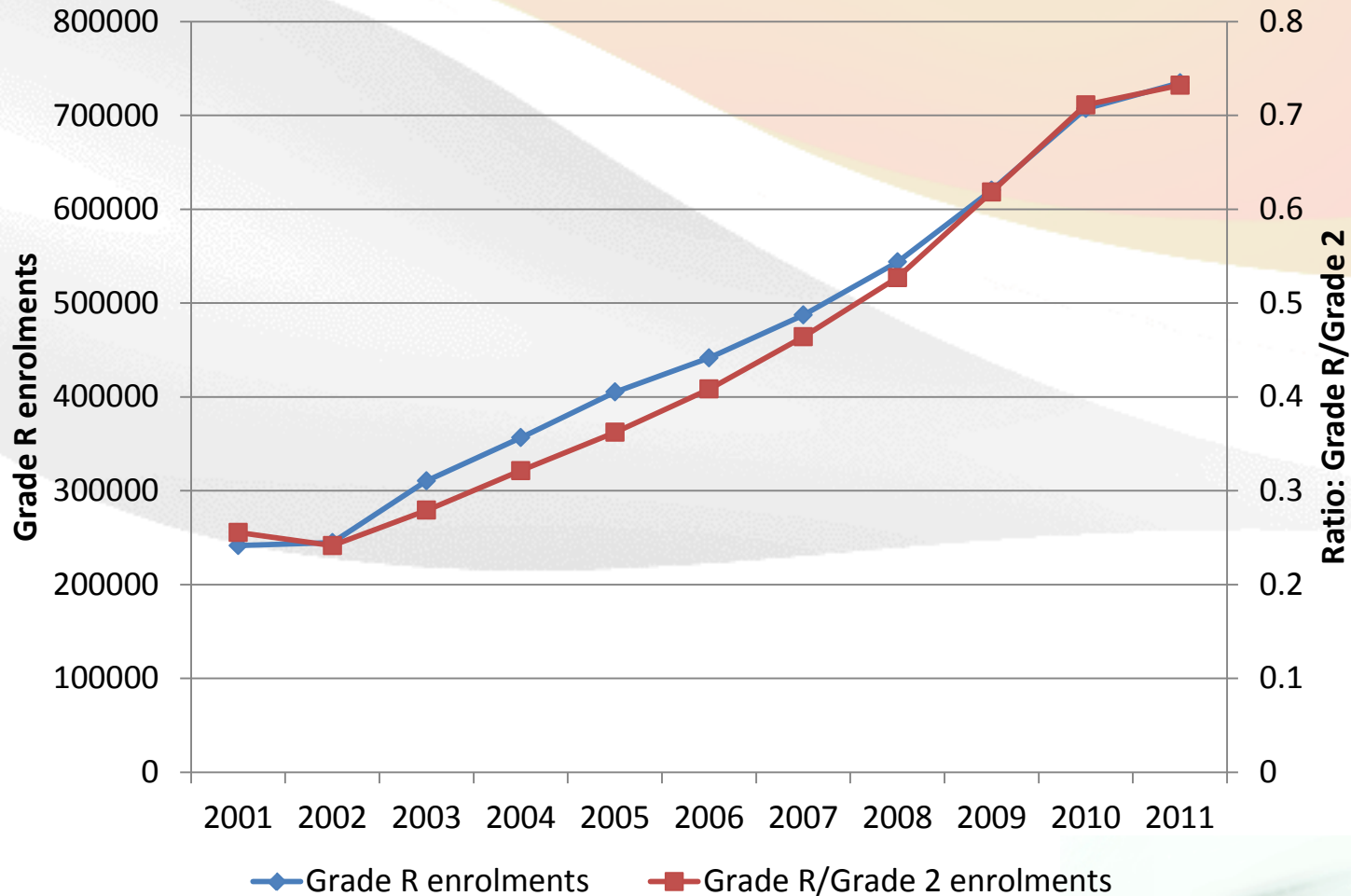


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Grade R enrolments since 2001 according to administrative data



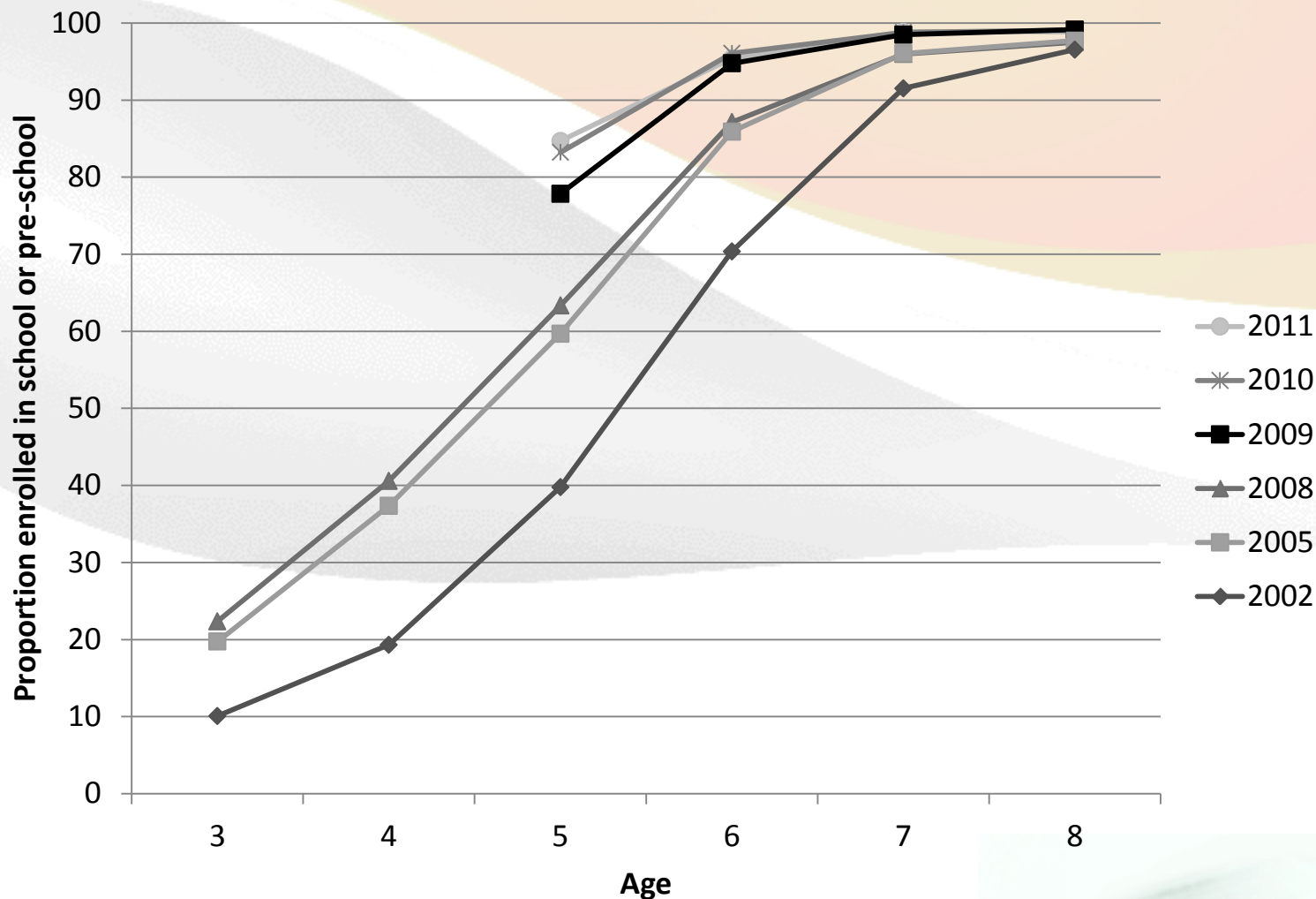
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Source: DBE (2012), Annual Survey of Schools (ASS)



Enrolment ratios age 3 - 8



The change in enrolment rates amongst 5 year-olds since 2002 by province

	2002 Enrolment rate	2011 enrolment rate	Percentage increase
WC	42.9%	73.3%	70.9%
EC	48.9%	89.2%	82.5%
GT	42.9%	82.8%	93.1%
KN	35.2%	74.8%	112.3%
LP	42.3%	91.1%	115.2%
FS	35.2%	80.5%	128.9%
MP	35.3%	84.2%	138.2%
NW	33.5%	84.9%	153.3%
NC	20.9%	75.9%	263.1%



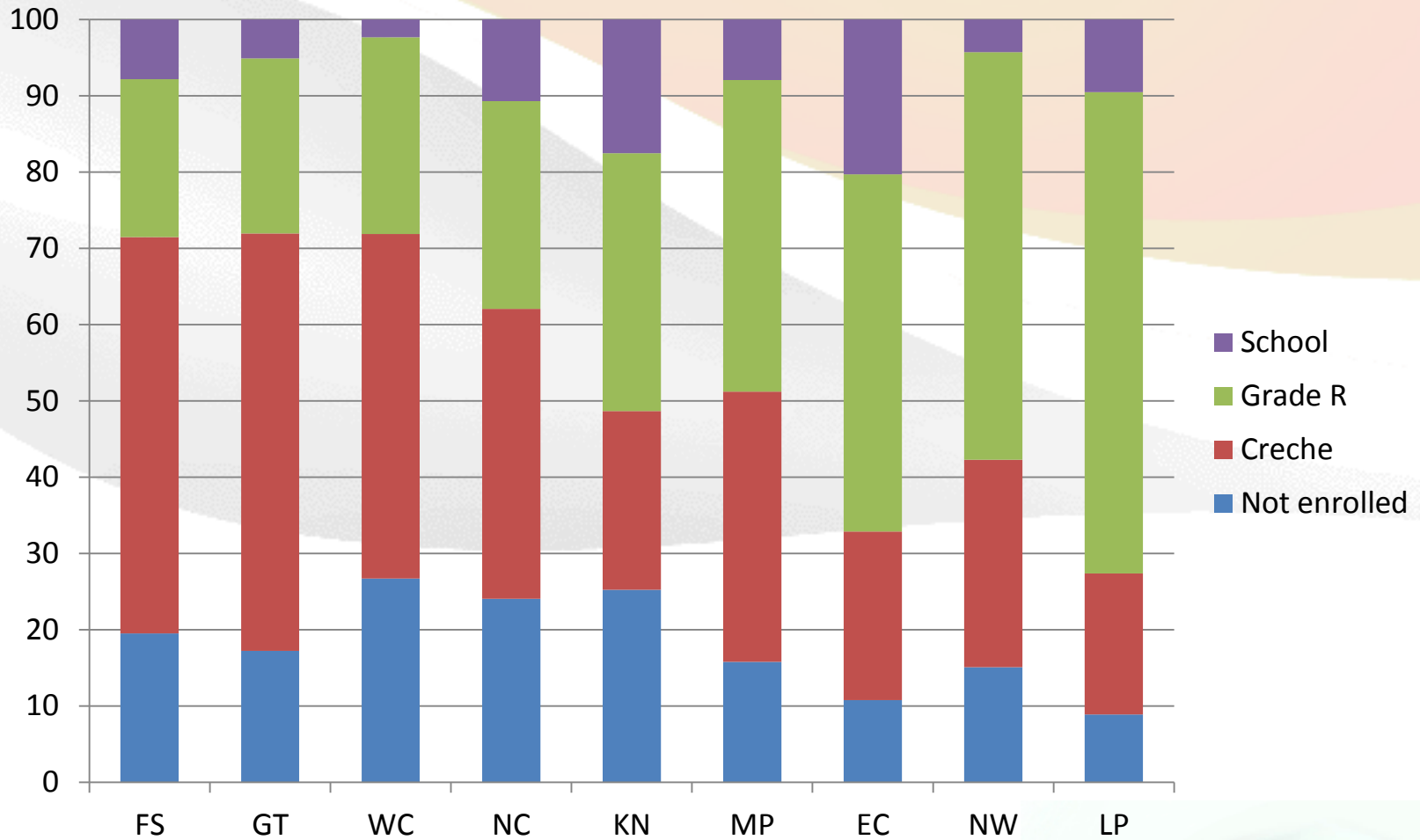
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Source: Own calculations based on
GHS (2002 & 2011)



Enrolment categories amongst 5 year-olds in 2011 by province



Estimating the impact of Grade R



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Estimating the impact of Grade R

- **Rolled out non-randomly**
(no exogenous source of variation in treatment identified)
- **I use observational data**
- **GHS:** Identifies current enrolment in grade R specifically; limited indicator of literacy
- **NIDS:** Identifies retrospective attendance of pre-school (7-14 year-olds); limited outcome measures; opportunity to use HH fixed effects **(Not reported here)**
- **SACMEQ:** Identifies retrospective attendance of pre-school (distinguishes amount) amongst grade 6 children (in 2007); Excellent outcome measure and school quality controls, but doesn't identify Grade R well.



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General Household Survey 2011



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Proportion of children that reportedly can write their name with no difficulty

	Not enrolled	Creche or other	Grade R	School	Total
WC	0.23	0.31	0.54	0.66	0.36
EC	0.17	0.32	0.22	0.58	0.31
NC	0.07	0.18	0.61	0.78	0.34
FS	0.10	0.36	0.48	0.56	0.35
KN	0.12	0.11	0.35	0.48	0.26
NW	0.00	0.28	0.44	0.47	0.34
GT	0.18	0.38	0.74	0.76	0.45
MP	0.13	0.33	0.31	0.39	0.30
LP	0.18	0.16	0.56	0.52	0.46
Total	0.14	0.29	0.44	0.55	0.35



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Source: GHS (2011)



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Total	0.14	0.29	0.44	0.55	0.35



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Source: GHS (2011)



Probit regressions predicting the probability of five year-olds being able to write their own name without any difficulty

	[1]	[2]	[3]	[4]
	All	Restricted	Rural (restricted)	Urban (restricted)
Crèche	0.28**	0.23	0.07	0.50*
Grade R	0.87***	0.85***	0.81***	1.21***
School	1.33***	1.38***	1.14***	2.14***
Coloured	0.37**	-0.3	-1.10**	-0.42
Indian/White	0.42**	-0.49	0.93	(omitted)
Male	-0.12*	-0.11	-0.27**	0.17
Difficulty: sight	-0.1	-0.38	-1.07*	0.71
Difficulty: concentration	0.01	0.17	-0.17	0.21
Difficulty: walking	-0.37	-0.4	-0.17	-0.88**
Household education	0.05	0.23*	0.13	0.87*
Household education squared	0	-0.01	0	-0.03
SES	0.17***	0.17**	0.09	0.43***
Constant	-2.18***	-2.58***	-2.28***	-6.95***
Observations	1986	984	682	295
Pseudo R-squared	0.12	0.16	0.11	0.28



Probit regressions predicting the probability of five year-olds being able to read with no or only some difficulty

	[5]	[6]	[7]	[8]
	All	Restricted	Rural (restricted)	Urban (restricted)
Crèche	0.31**	0.19	-0.16	0.59
Grade R	0.50***	0.56***	0.28	0.97***
School	1.12***	1.01***	0.66***	1.81***
Coloured	0.05	0.1	(omitted)	0.16
Indian/White	-0.16	-0.23	(omitted)	-0.47
Male	0.01	-0.07	-0.13	-0.03
Difficulty: sight	-0.66**	-0.75	-0.68	(omitted)
Difficulty: concentration	-0.29	-0.35	-0.62	0.14
Difficulty: walking	-0.12	0.09	0.41	(omitted)
Household education	-0.03	0.09	0.01	0.22
Household education squared	0	0	0	-0.01
SES	0.12**	0.20***	0.16*	0.45***
Constant	-1.90***	-2.74***	-1.37**	-4.53***
Observations	1987	986	654	279
Pseudo R-squared	0.08	0.1	0.07	0.22



SACMEQ 2007



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Coefficients on preschool in education production functions using SACMEQ 2007

	[1] Spaull 2011 maths	[2] Spaull 2011 reading	[3] Present author maths full model	[4] Present author reading full model
Some months	1.93	5.17	2.15	4.07
1 year	7.68*	10.83***	2.54	6.70**
2 years	5.13	18.98***	1.61	15.16***
3 years plus	9.66***	11.87***	5.54*	9.63***

Source: SACMEQ 2007

In all cases the reference category is “did not attend any preschool”.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$



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Coefficients on preschool from school fixed effects regressions using SACMEQ 2007

	Dependent Variable: Reading	Dependent Variable: Mathematics
Preschool: 1 year	3.12	-0.07
Pre-school: 2 years or more	6.63***	3.90*
Observations	9071	9051
R-squared	0.67	0.60

Source: SACMEQ 2007

The explanatory variables included gender, age, socio-economic status, mother's education, frequency of speaking English at home, household size, whether the child stays at home with his/her parents, the number of books in the home, weekly time spent on household chores, and whether the child sometimes goes hungry.

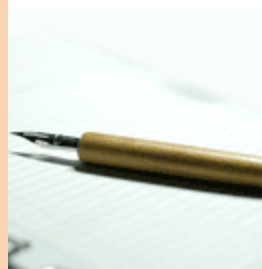
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Interpreting these SACMEQ results

- Smallish effect size:
- Reason for possible upward bias:
 - Remaining unobserved individual differences
- Reasons why the true impact of grade R may be larger:
 - School fixed effects limits comparison between similar communities who for exogenous reasons differed in terms of grade R exposure.
 - More recent Grade R programme may have been more beneficial than “pre-school” obtained by SACMEQ children.



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Conclusions

- **Low & unequal educational outcomes early on**
 - Increased exposure to pre-school through Grade R must be seen as a positive development
 - Questions around institutional quality remain
- **Cautious conclusions around impact**
 - Some immediate benefits are evident
 - Smallish benefits persist until grade 6
- **Future research**
 - Experimental research testing a quality intervention



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Predicted probabilities of being able to write one's name/read

	Model [1] (Writing name)	Model [2] (Writing name) (restricted)	Model [5] (Reading)	Model [6] (Reading) (restricted)
Not enrolled	0.13	0.32	0.07	0.04
Crèche	0.20	0.41	0.12	0.06
Grade R	0.39	0.65	0.17	0.12
School	0.58	0.82	0.36	0.24



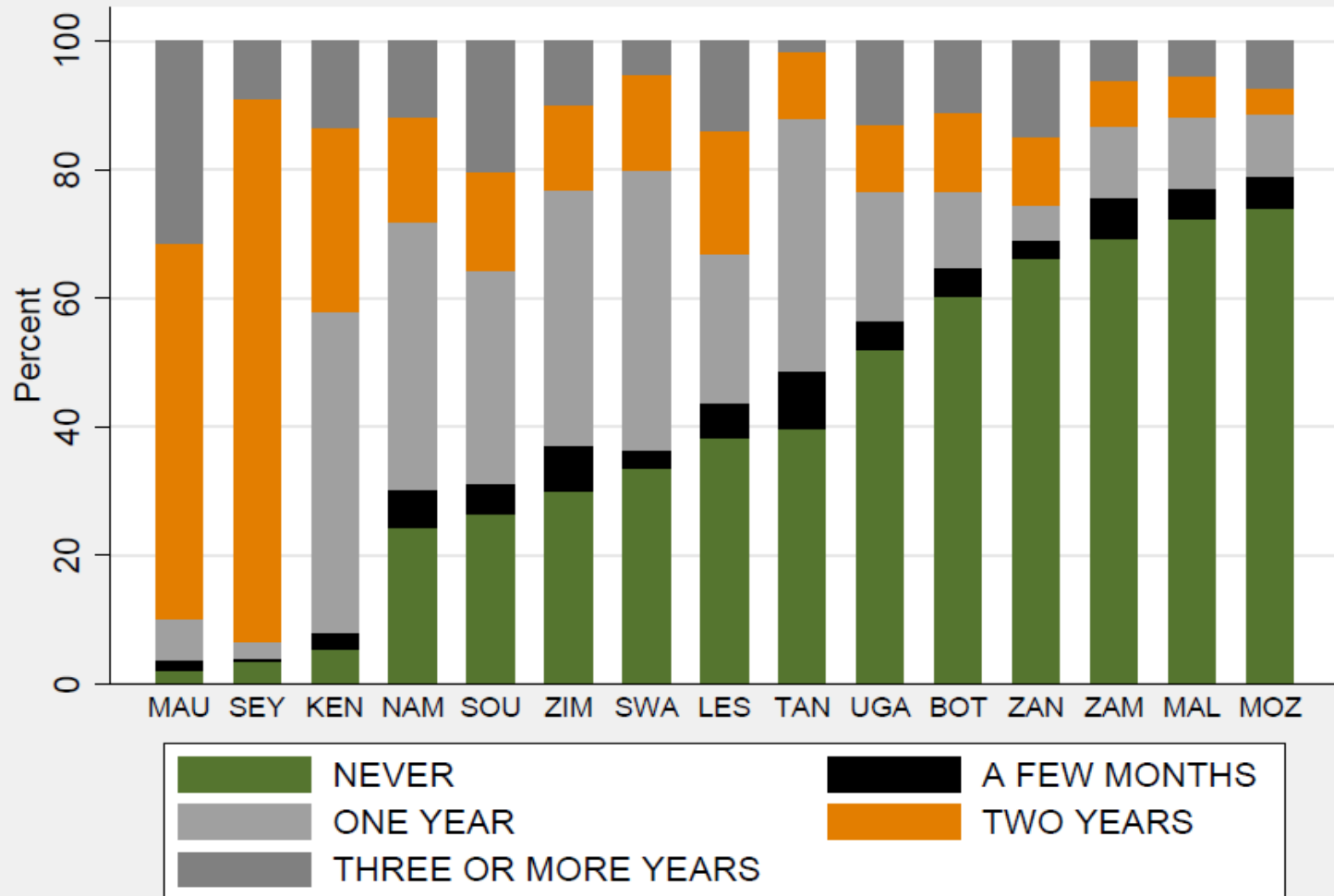
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Source: GHS 2011



Proportions of students having attended various amounts of pre-school in regional comparison



Source: SACMEQ 2007



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