

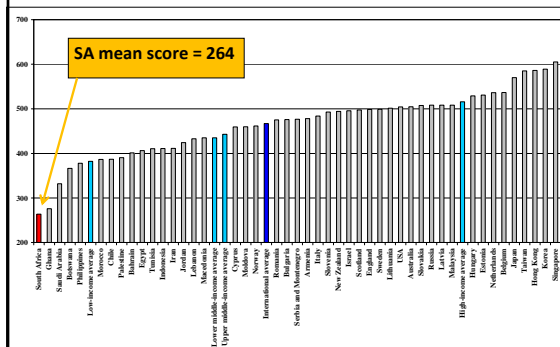
## Predicting matric achievement based on grade 8 achievement

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### Education in SA: Stylised facts

1. South Africa's overall level of performance is alarmingly low.

Figure 1: National average scores for maths in TIMSS 2003 (mean 500; s.d. 100)



### Education in SA: Stylised facts

1. South Africa's overall level of performance is alarmingly low.
2. There is wide variation across the distribution of educational achievement in South Africa.
3. Educational achievement differs dramatically on the basis of socio-economic status (SES).
4. The distribution of South Africa's educational achievement is characterised by bimodality.
  - Former education departments

### So, what is today's contribution?

- A unique dataset
  - Owned by the Human Sciences Research Council (HSRC) and jointly processed and analysed by the University of Stellenbosch and the HSRC.
  - Tracking grade 8 students (TIMSS 2002) to matric in 2006 or 2007.
- How deterministic is grade 8 achievement for matric achievement?
- How does grade 8 achievement impact on matric subject choice?
- How well do schools convert demonstrated human capital in grade 8 into matric achievement?
- Are there interesting differences in this ability to convert across different parts of the school system?

### The data

- 8952 grade 8 students in TIMSS 2002
- 2734 successfully identified in matric (2006/2007 or both)
- Follow through of 31%
- GHS: follow through rate = 56%
- Thus a sample selection problem:
  - Impossible to know for sure whether a non-tracked individual dropped out of school or was simply "missed" in the identification process.

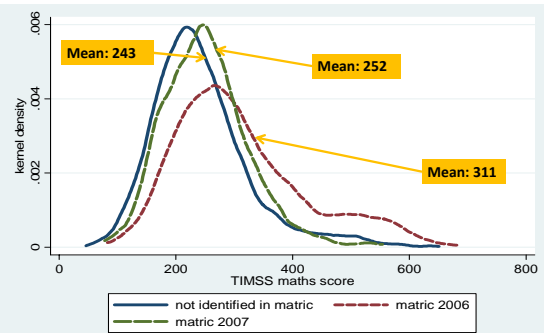
**Table 1: Weighting calculations (For those captured)**

|          | TIMSS % | GHS % | P=T%/GHS% | Weight=1/P |
|----------|---------|-------|-----------|------------|
| Black    | 25.34   | 55.34 | 0.457896  | 2.1839     |
| Coloured | 47.2    | 53.56 | 0.881309  | 1.134676   |
| Indian   | 47.06   | 88.08 | 0.534304  | 1.871594   |
| White    | 73.86   | 86.65 | 0.852405  | 1.173151   |

Those captured in matric were weighted up by the inverse of the proportion of the capturing rate relative to the GHS follow through rate, for each race.

Similarly, those not captured in matric were weighted down, separately for each race in accordance with the GHS.

**Figure 2: Kernel density of TIMSS maths by identification and matric year**



**Table 2: Mean TIMSS maths scores by ex-department and matric cohort**

|                | matric 2006   | matric 2007   | Not tracked   |
|----------------|---------------|---------------|---------------|
| <b>DET (B)</b> | <b>256.68</b> | 232.21        | 219.97        |
|                | 1162          | 620           | 5042          |
| <b>HOR (C)</b> | 367.54        | <b>317.83</b> | <b>303.12</b> |
|                | 350           | 122           | 713           |
| <b>HOD (I)</b> | 398.59        | 308.4         | 331.48        |
|                | 121           | 35            | 150           |
| <b>HOA (W)</b> | 473.29        | 404.22        | 422.84        |
|                | 398           | 56            | 313           |

Analysis of passing matric

**Table 3: Matric "pass rates" by race and ex-department (with weighting)**

|              | Pass rate 1   | Pass rate 2   |
|--------------|---------------|---------------|
| Black/DET    | 65.22%        | 33.56%        |
| Coloured/HOR | 76.21%        | 36.57%        |
| Indian/HOD   | 93.18%        | 74.52%        |
| White/HOA    | 96.61%        | 71.29%        |
| <b>Total</b> | <b>72.28%</b> | <b>39.59%</b> |

Pass rate 1= those passed / those identified in matric

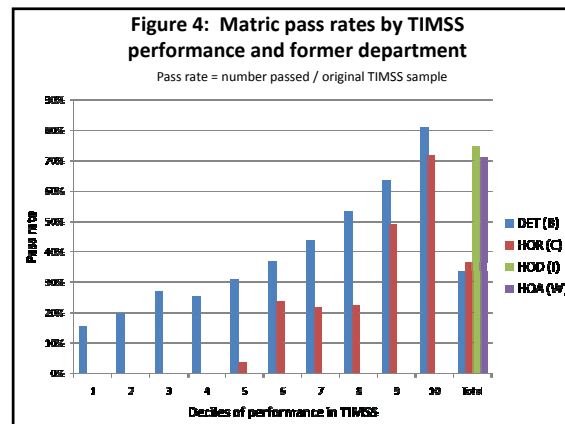
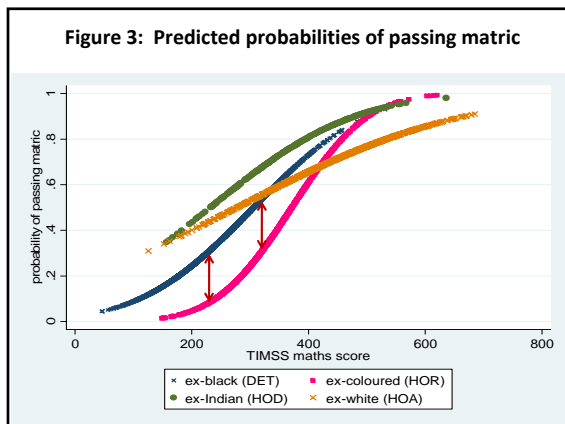
Pass rate 2= those passed / original TIMSS sample

**Table 4: Probit regression predicting passing matric**

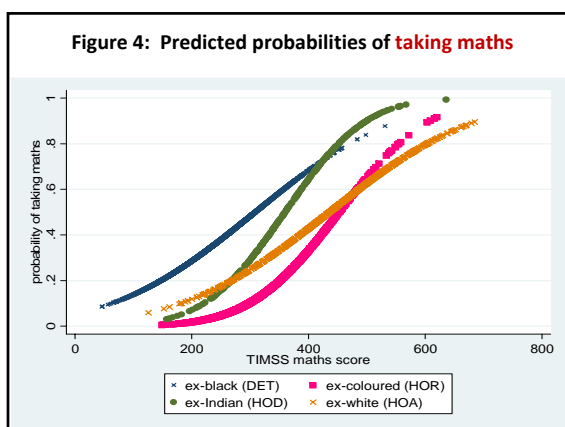
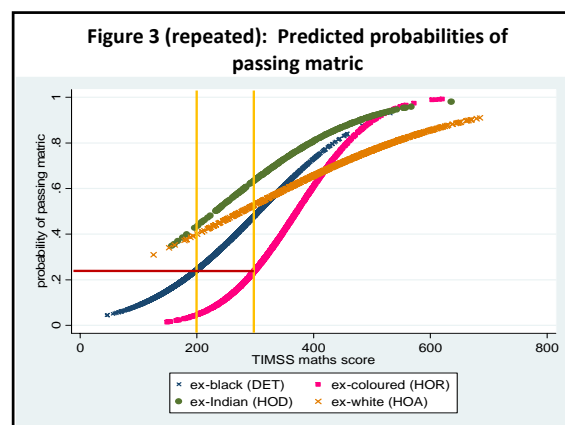
Dependent variable: Pass = 1; No pass = 0

| Explanatory variables | Marginal effects coefficient | Standard error |
|-----------------------|------------------------------|----------------|
| TIMSS maths score     | 0.0025**                     | 0.00016        |
| HOR (C)               | -0.4055**                    | 0.038          |
| HOD (I)               | 0.3101*                      | 0.136          |
| HOA (W)               | 0.4094**                     | 0.091          |
| HOR*TIMSS maths       | 0.0012**                     | 0.00038        |
| HOD*TIMSS maths       | -0.0005                      | 0.00039        |
| HOA*TIMSS maths       | -0.0012**                    | 0.00027        |
| Constant              | -1.9970**                    | 0.108          |
| Observations          | 8752                         |                |
| Pseudo R-squared      | 0.1362                       |                |

\*Significant at 5% level \*\*Significant at 1% level

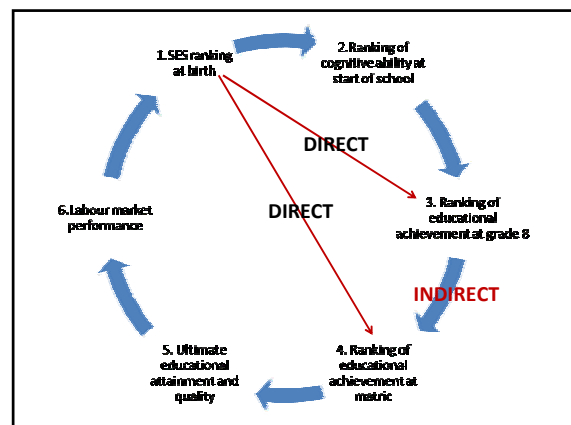
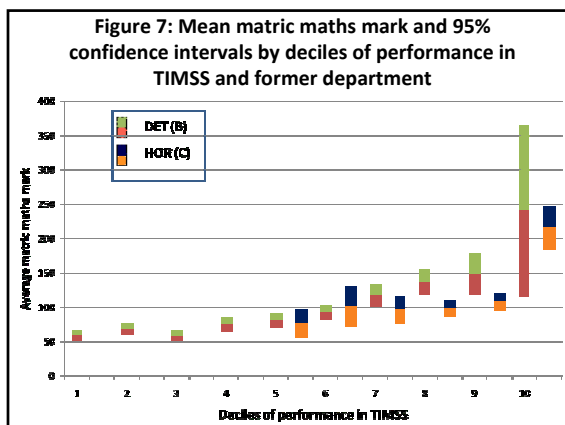
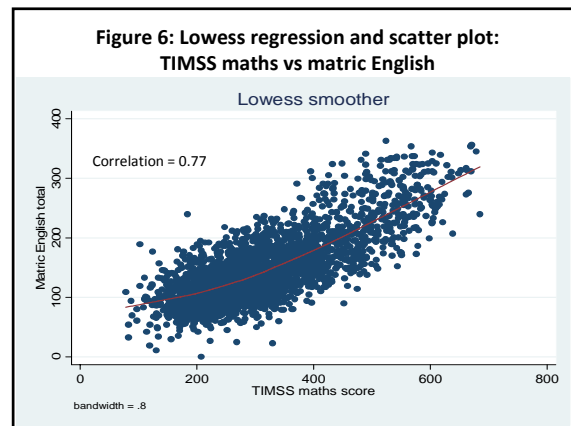
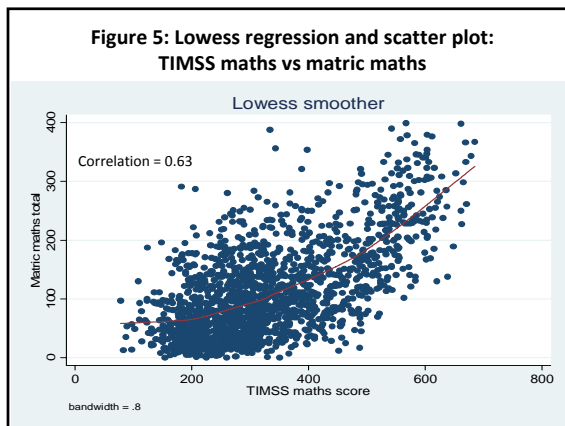


- Possible explanations**
- Successful interventions in predominantly black high schools
  - Under-utilisation of human capital in coloured schools
  - Systematic underestimation of the capabilities of students in historically black schools in TIMSS, but not in matric to the same extent.
    - Assessment that does not do a good job of sorting students according to ability – lack of feedback to students.
    - Poor test writing skills at grade 8 in ex-DET school
    - Lam, Ardington & Leibbrandt (2008): large stochastic component in assessment and grade progression in predominantly black schools



**The association of TIMSS maths with matric maths and English performance**

(Briefly...)



## Conclusions (1)

- Historically white and Indian schools appear to convert demonstrated human capital at grade 8 into matric achievement better than historically black and coloured schools.
  - Probably reflective of a real efficiency advantage
- Historically black schools appear to convert better than historically coloured schools.
  - Contending explanations:
  - The favourite at this stage:

Weak assessment practices and poor exam writing technique may have contributed to a systematic underperformance in TIMSS amongst historically black schools.

## Conclusions (2)

- Differences in conversion of grade 8 achievement into matric achievement are not so much influenced by SES *per se*, but they are by the historically different and persistently differently functioning parts of the school system.
- Efficiency differences between these parts of the school system hold implications for social mobility.
  - One aspect of (in)efficiency that might deserve attention is quality of assessment in a large section of South African schools.