Student Pathways in South African Secondary Schools

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FACTS

- There is a concern about the quality of education in South Africa, and in particular mathematics/numeracy performance throughout the educational system.
- Mathematics performance is a proxy for analytical skills; that allows one to participate in the knowledge economy.
- There have been many initiatives and programmes by government, NGOs, business etc to improve the state of mathematics education, but we have not seen the expected returns on that investment.

A STORY

World Development Report, 2006

Analysis of a quasi-panel dataset: TIMSS grade 8 learners tracked and identified in the matric 2006 and 2007 dataset

Grade 8 math scores of individuals in 2002	**Throughput** **Subject choice** **Performance** **Grade 8 scores predicting grade 12 scores**	Individuals identified in grade 12 matric (2006 & 2007) database

Main Findings & Recommendations

1. Grade 8 TIMSS mathematics performance is a **predictor of mathematics performance** in grade 12. If you want to improve grade 12 mathematics results, we must raise the mathematics scores before grade 8.

2. In general TIMSS mathematics performance is a predictor of **matric pass rates**. For students with low TIMSS math scores the predictive value for achieving matric pass rates is not as strong. So we do not give up on students.

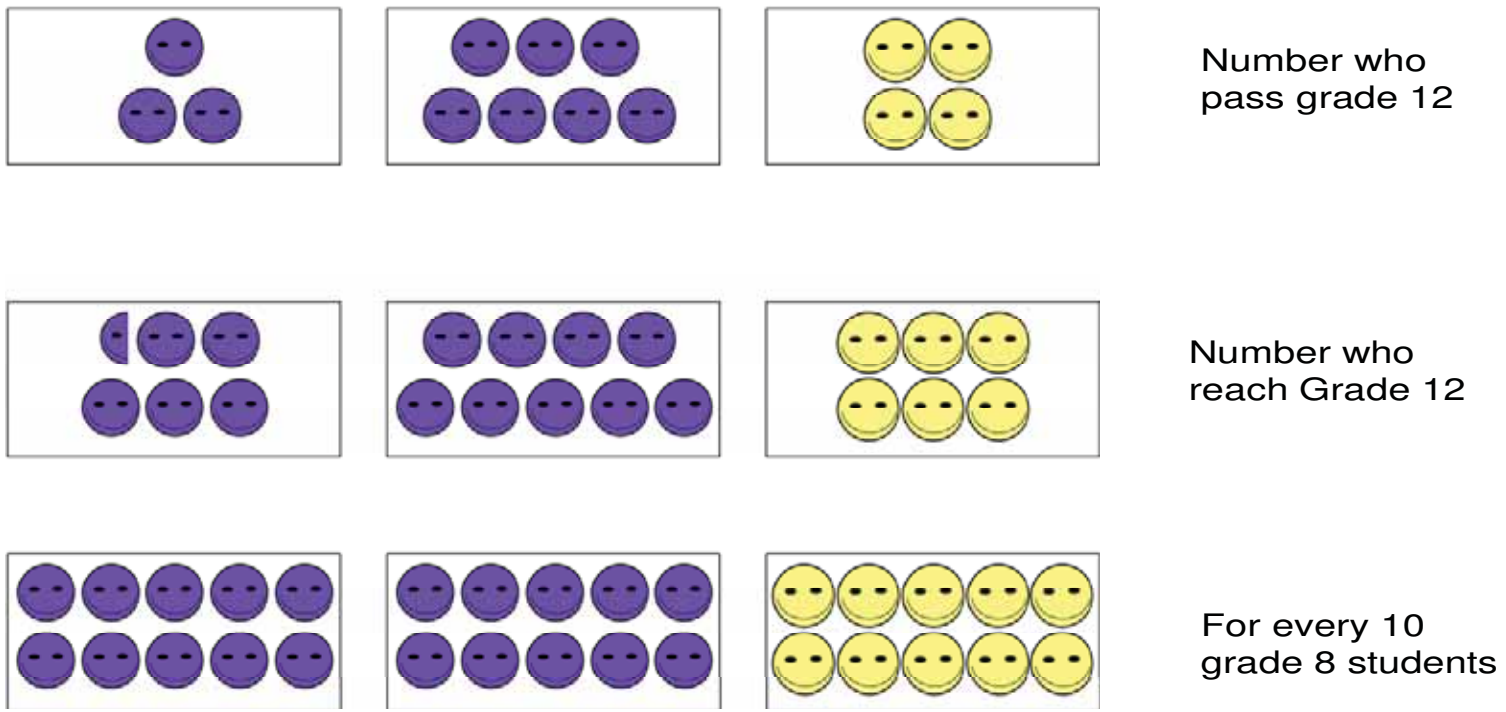
South African mathematics performance

- The national mean mathematics scores are low,
- The national average mathematics achievement score at different grade levels is similar and stable;
- There is a high differentiation in the performance of students in different SES conditions i.e. we have two systems of education; [in our analysis we will refer to System 1 and System 2].
- Levels of education of the population is low and levels of parental education has an impact on performance.

Analysis of the TIMSS cohort data

- Patterns **of progression rates** from grade 8 to 12;
- Patterns of **performance:** matric pass rates and performance in Math;
- Is the TIMSS 2002 mathematics performance a **predictor** for grade 12 performance?

FINDING 1: PROGRESSION RATE



FINDING 2: MATH PERFORMANCE PATTERNS

	SYSTEM 1 SCHOOLS	SYSTEM 2 SCHOOLS	OVERALL
Average SG* math score	25%	42%	29%
TIMSS SCORE	**258 (0.31)**	**442 (0.51)**	**293**
Average HG* math score	30%	63%	45%
TIMSS SCORE	**286 (0.46)**	**545 (0.54)**	**431**

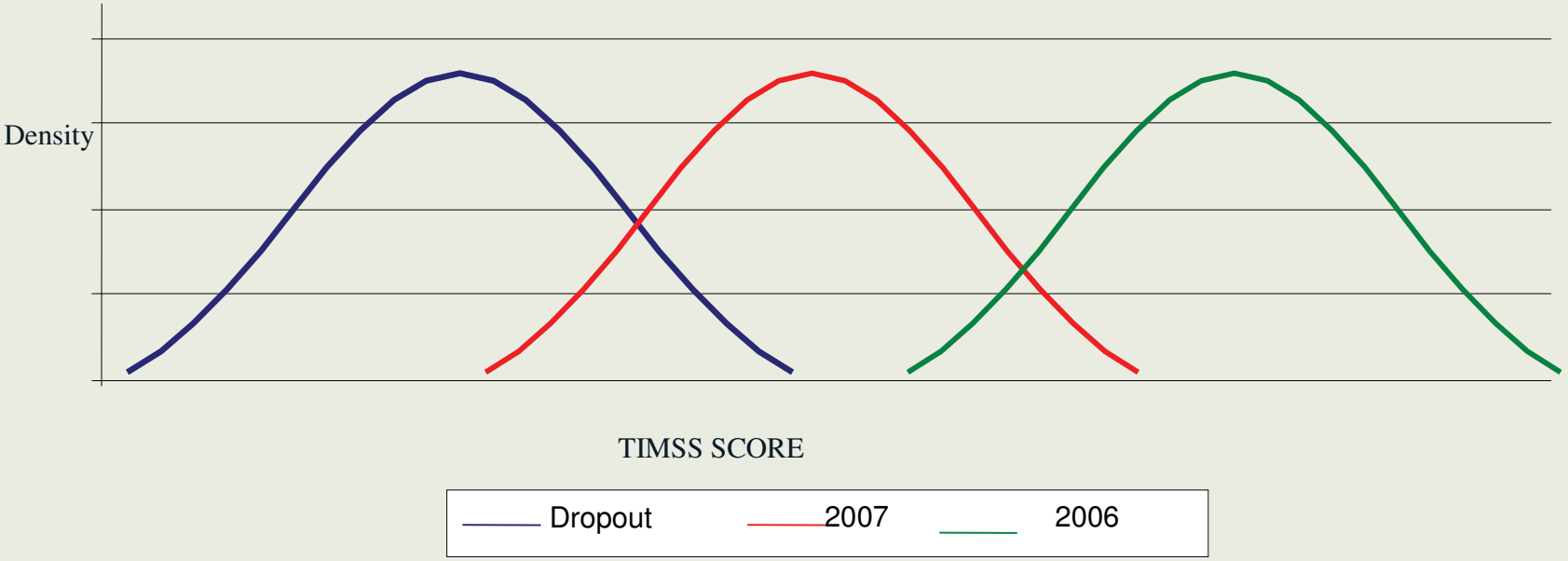
FINDING 3: Grade 8 math scores predicting Grade 12 performance

3.1. Predicting passing grade 12 examinations from TIMSS grade 8 math scores.

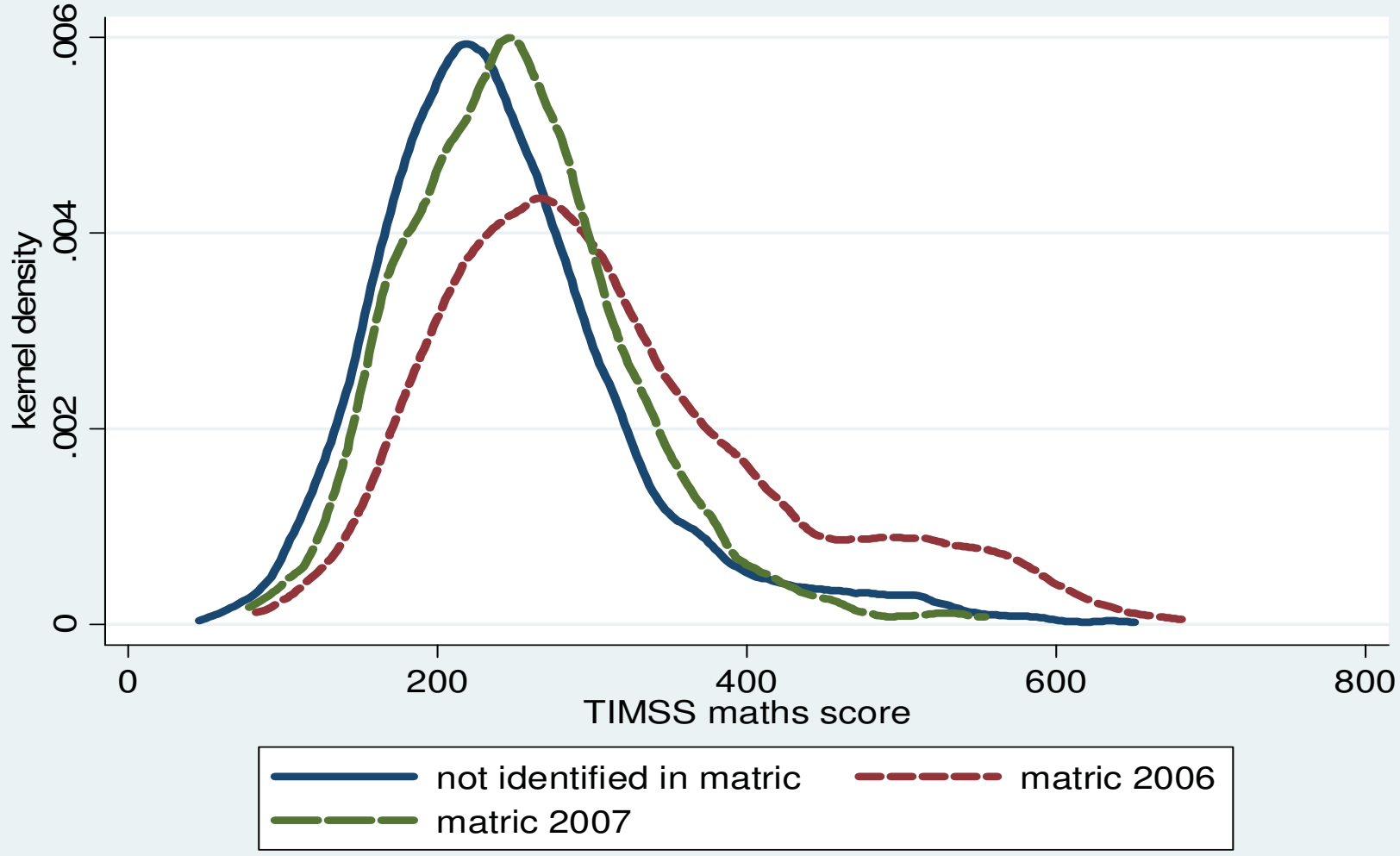
3.2. Predicting matric math selection from TIMSS grade 8 math performance.

3.3. Predicting matric math performance from TIMSS math performance.

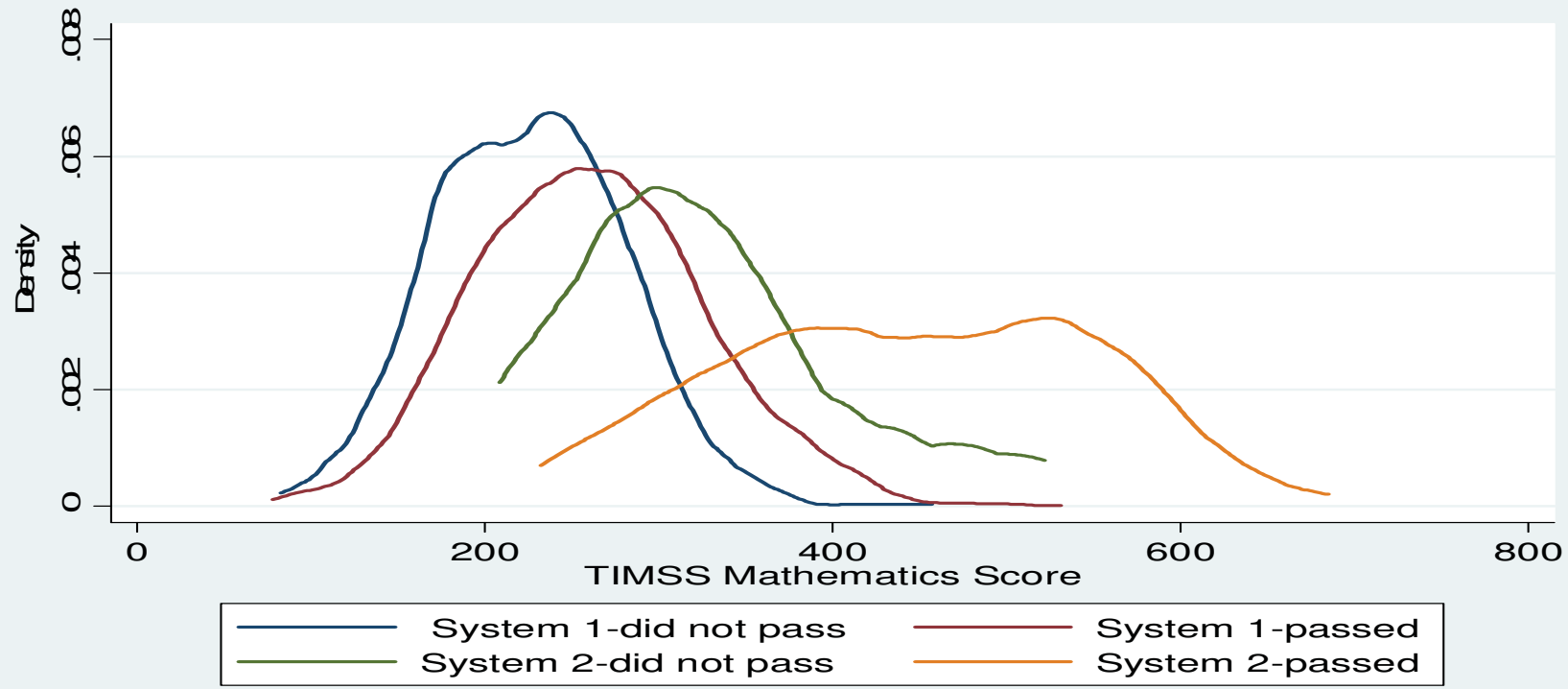
3.1. Theoretical profile of patterns of performance



3.2. Kernel density of TIMSS maths by identification and matric year

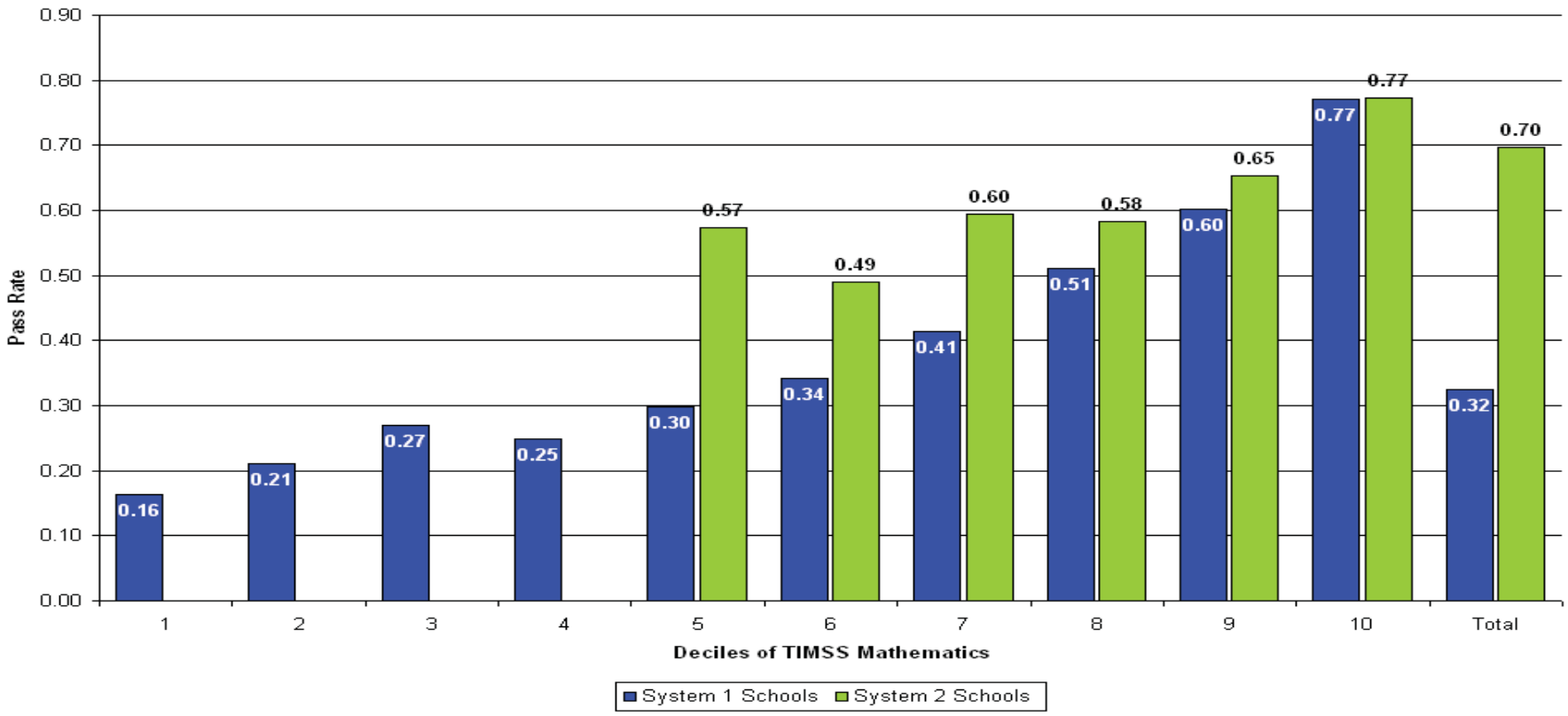


3.3. Passing grade 12 examinations from grade 8 math scores



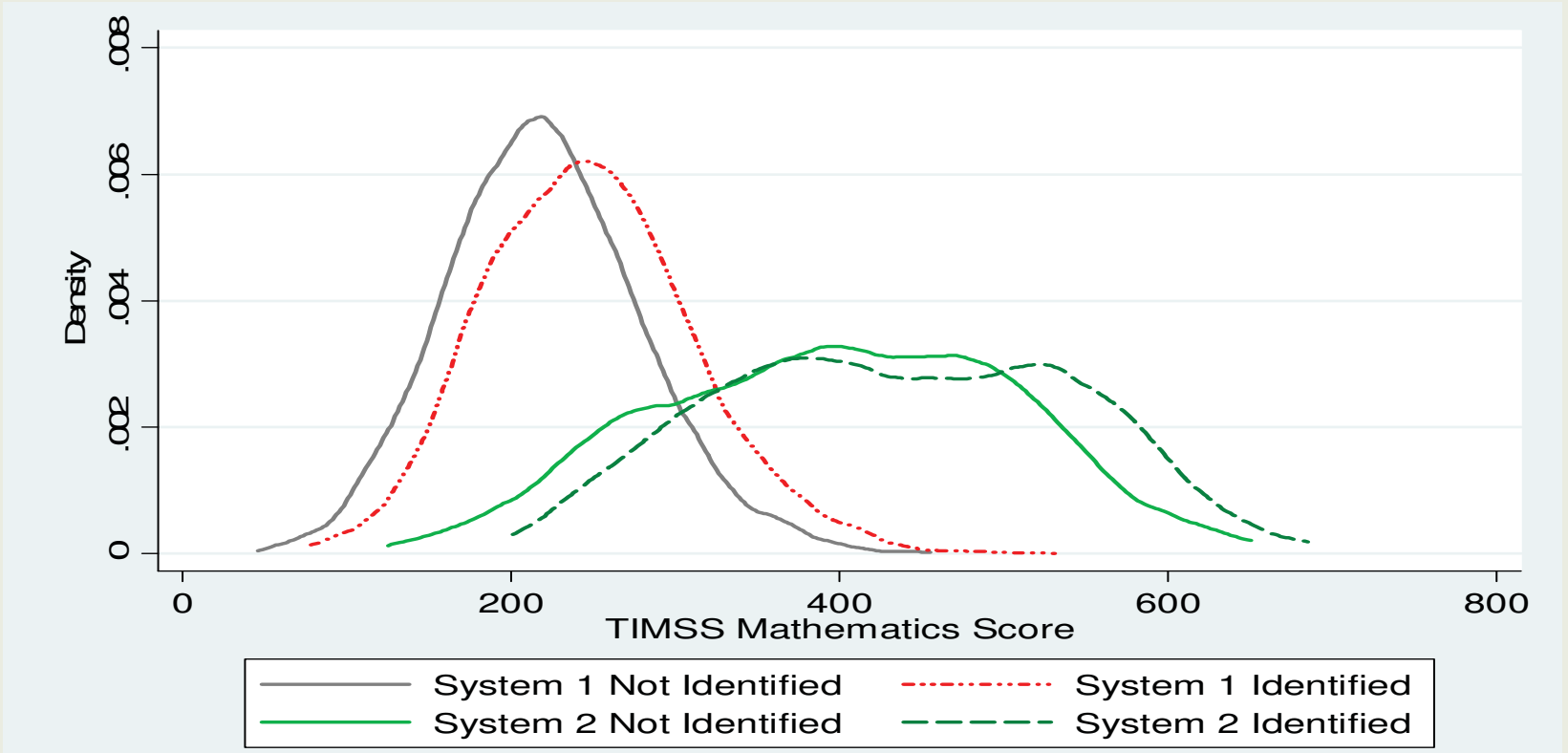
	TIMSS mean score System 1	TIMSS mean score System 2
Did not pass matric	**226 (529)**	**324 (29)**
Passed matric	**261 (1066)**	**444 (550)**
Not identified in matric	**220 (5042)**	**398 ( )**

3.4. Converting to matric pass rates by school type & deciles of TIMSS achievement



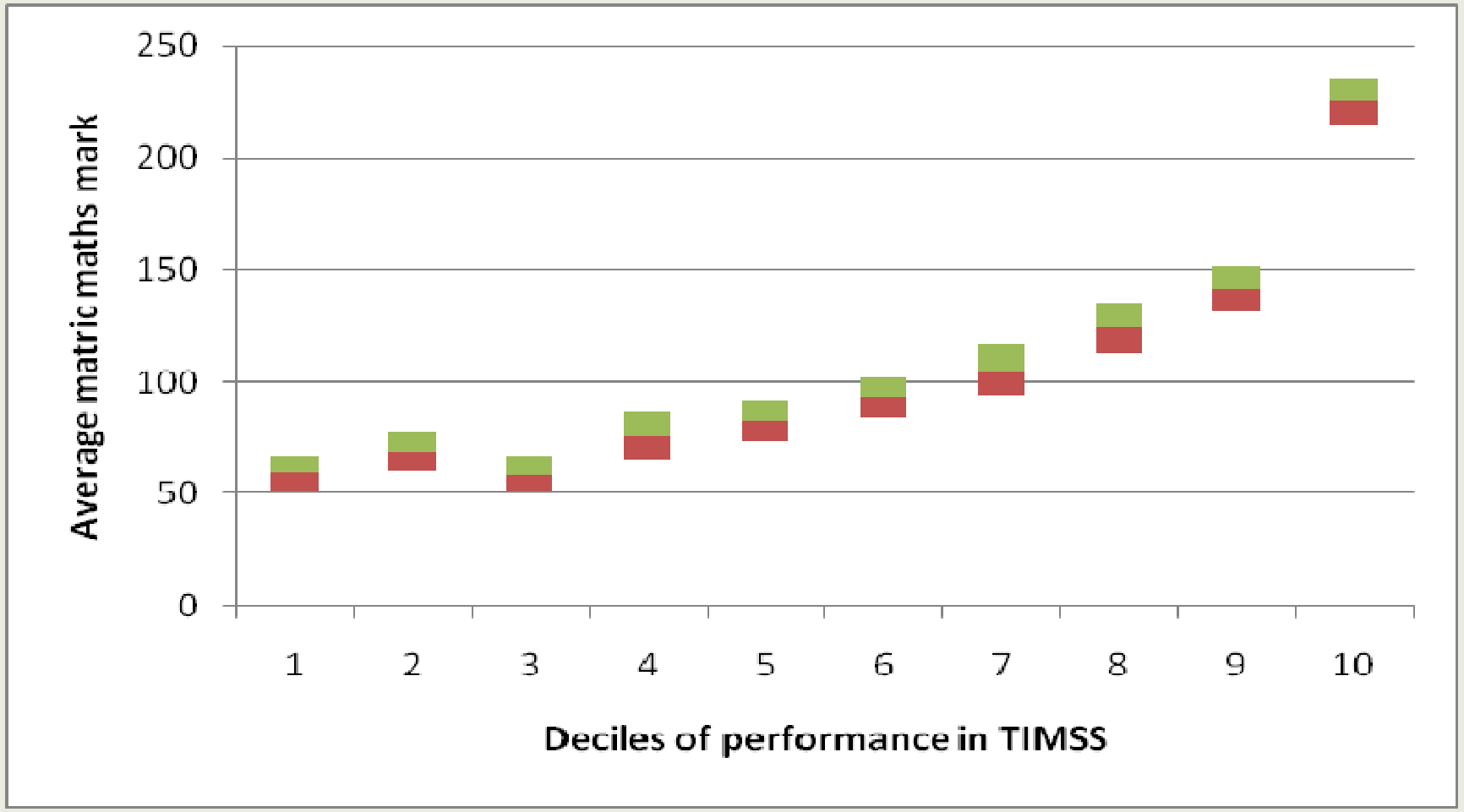
	1	2	3	4	5	6	7	8	9	10	Total
System 1 Schools	904	888	874	858	812	783	675	576	371	68	6809
System 2 Schools	5	8	10	15	29	37	51	82	199	637	1073
Total	909	896	884	873	841	820	726	658	570	705	7882

3.5. Math selection in grade 12 by school type



	System 1	System 2
Not identified in matric	220 (n = 5042)	398 (n = 463)
Identified in matric	247 (n = 1762)	434 (n = 610)

3.6 Average matric math performance by TIMSS performance



CONCLUDING COMMENTS

1. In general grade 8 performance predicts the probability of passing matric. The higher the TIMSS scores, the higher the probability of passing matric.

   TIMSS grade 8 score is a not a good predictor of matric performance for lower TIMSS scores. Students who are in the lowest TIMSS mathematics performers have a one in five chance of passing matric.

   The reasons could be that TIMSS is not a good predictor of capabilities of students or it could be the investments taking place in the poorest schools have an effect on 20% of the group or that the link between passing matric and demonstration of analytical reasoning is not strong or that it is easy to get through matric.

2. TIMSS grade 8 scores is a strong predictor for matric mathematics achievement. TIMSS assesses analytical competences and the scores reflect those analytical competences.

   If we want to raise the mathematics grade 12 performance, we need to raise scores before grade 8. Combining this with the literature of cognitive development will suggest that the earlier the interventions are made the higher the returns on that investment.

IMPLICATIONS

1. Investment in foundation phase of education is critical for the long term development.

2. In the short term we need to continue the interventions throughout the system, as there are possibilities of “catching” some students.