


HG Maths versus NSC Maths: Implications for university admissions and academic performance in Commerce courses

Karin Hunt
Dr Miracle Ntuli
Dr Neil Rankin
Valker Schöer
Claire Sebastião

African Microeconomic Research Unit
School of Economics and Business Sciences
University of the Witwatersrand

AMERU

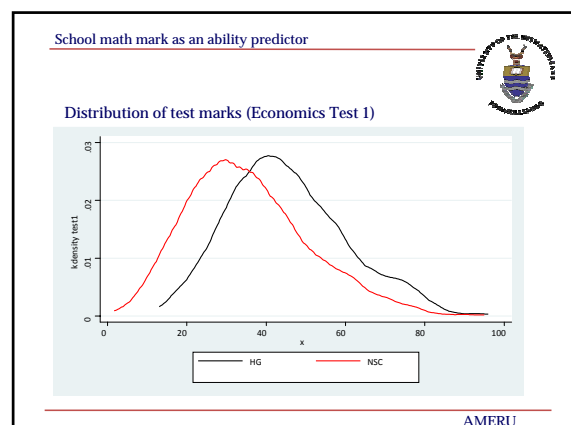
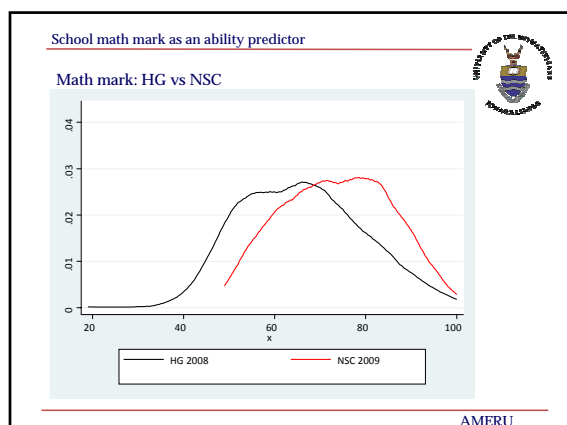



School math mark as an ability predictor

Background

- Performance in matric maths has been a reliable predictor of performance in commerce courses and has been integral in deciding who will be admitted to study in the commerce faculty at Wits.
- 2009 was the first year that students matriculated with NSC maths
- Increase of students admitted to Ecos1 in 2009 raises the question: is NSC maths a reliable signal of ability as HG maths was?
- If the reliability of matric maths as an ability signal has deteriorated, students with no chance of passing could be admitted and university resources will be wasted.

AMERU






School math mark as an ability predictor

Objectives

- The paper aims to estimate the predicted score for HG maths for students who wrote NSC maths.
- Determine the *real level of ability* (compared to HG students' abilities) that an NSC score indicates.
- This information may be used to adjust the admission requirements accordingly.

AMERU



School math mark as an ability predictor

Methodology – data used

- Students in both 2008 and 2009 wrote comparable first tests for both Ecos1 and ComMaths.
- Information from application forms, scores for Ecos & ComMaths tests combined with students' scores they obtained for either matric and NSC maths, make up our data set.

AMERU



Methodology – regression used

- We estimate a regression of the following form on the Matric sample:

$$y_i = \alpha + X_i' \beta + \delta test_i + \epsilon_i$$

Where:

- y_i is the result that an individual obtained for HG Matric maths;
- α is the constant term;
- x_i is a vector of individual specific characteristics including gender, race, home province, whether the individual lives in residence and whether the individual has financial aid;
- $test$ is the test score that an individual achieved in either ComMath test 0 or Ecos test 1
- The results from this equation are then used to predict the HG maths score that the NSC students would have obtained.

VARIABLE	(1)	(2)	(3)	(4)
	MATHEMATICS_B0_comb	MATHEMATICS_B0_comb	MATHEMATICS_B0_comb	MATHEMATICS_B0_comb
test1	0.484***	0.292**	0.482***	0.249*
test1_2	0.02261	0.0114	0.02261	0.02234*
test1_3	0.00224			0.00224
Male	-0.0273	-0.0698	-0.0235	-0.054
Home language	(1.056)	(0.857)	(0.897)	(0.889)
Black	(1.660)	(1.702)	(1.736)	(1.775)
Coloured	(1.738)	(1.738)	(1.738)	(1.738)
Indian	(1.488)	(1.488)	(1.488)	(1.488)
FR	(1.389)	(1.389)	(1.389)	(1.389)
EC			-4.512*	-4.047*
FIN			(2.506)	(2.501)
FIN2			-1.115	-1.115
LIMPOPO			-0.0534	-0.0292
NDC			(2.237)	(2.137)
NW			-0.120	-0.089
NC			(2.915)	(2.875)
WC			(1.023)	(1.106)
FEAID			(5.605)	(5.112)
FEAID2			-0.463	-0.388
WFS_RESIDB0F	4.175***	4.295***	4.397***	4.501***
constant	42.82***	46.92***	43.25***	48.24***
Observations	619	619	619	619
R-squared	0.403	0.405	0.418	0.420

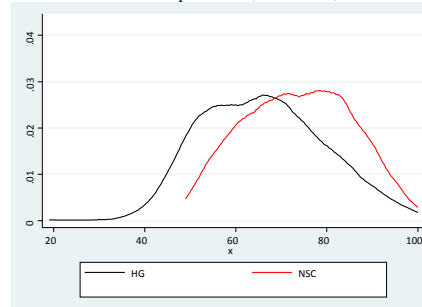
*** p<0.001, ** p<0.01, * p<0.1
Robust standard errors in parentheses



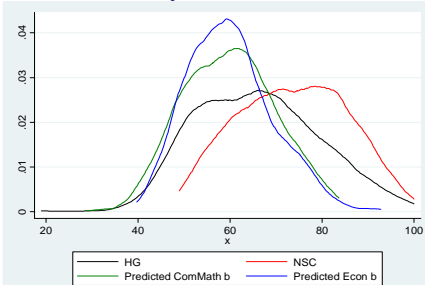
Results



Math mark: actual and predicted (HG vs NSC)



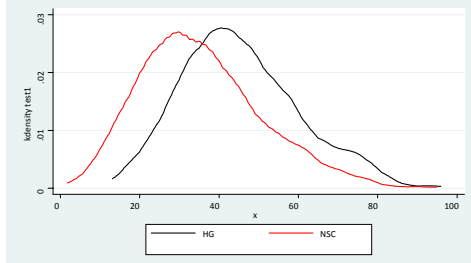
Math mark: actual and predicted (HG vs NSC)



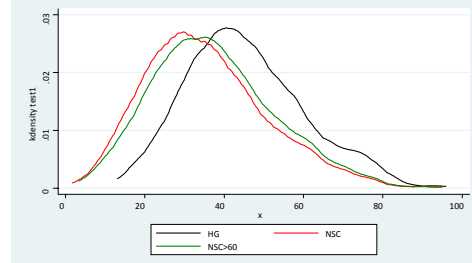
Predicted Percentage		80-100	70-79	60-69	50-59	40-49	30-39
Matric		A	B	C	D	E	F
Actual NSC							
ComMath - linear, provinces	Mean	93.45	86.21	76.83	69.90	62.27	65.25
	Std dev	2.38	7.11	9.57	9.72	7.72	16.13
- non-linear, provinces	Mean	92.65	84.87	78.49	67.99		
	Std dev	3.44	7.74	10.18	9.76		
Econ - linear, provinces	Mean	89.18	85.89	77.41	68.99	65.52	
	Std dev	7.14	8.00	9.33	11.20	8.86	
- non-linear, provinces	Mean	89.18	85.27	77.22	68.82	64.69	
	Std dev	7.14	8.01	9.82	10.95	8.95	



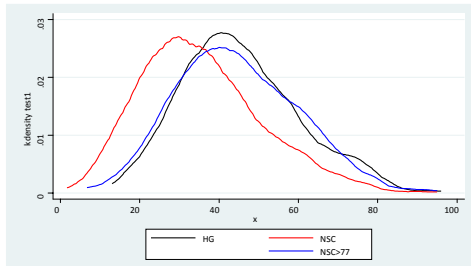
Distribution of test marks (Economics Test 1)



Distribution of test marks (Economics Test 1)



Distribution of test marks (Economics Test 1)



Conclusions

- The NSC maths scores definitely do not signal the same ability as the HG maths scores used to.
- Either admission requirements need to be more stringent or alternate admissions tests need to be used to determine ability and admission