The Pitfalls of using logistic regression analysis in determining the predictive value of NSC results

16 September 2014

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Outline

- Background

- Purpose of the study

- Methodology

- Overall Findings

- Pitfalls of using logistic regression in this kind of study
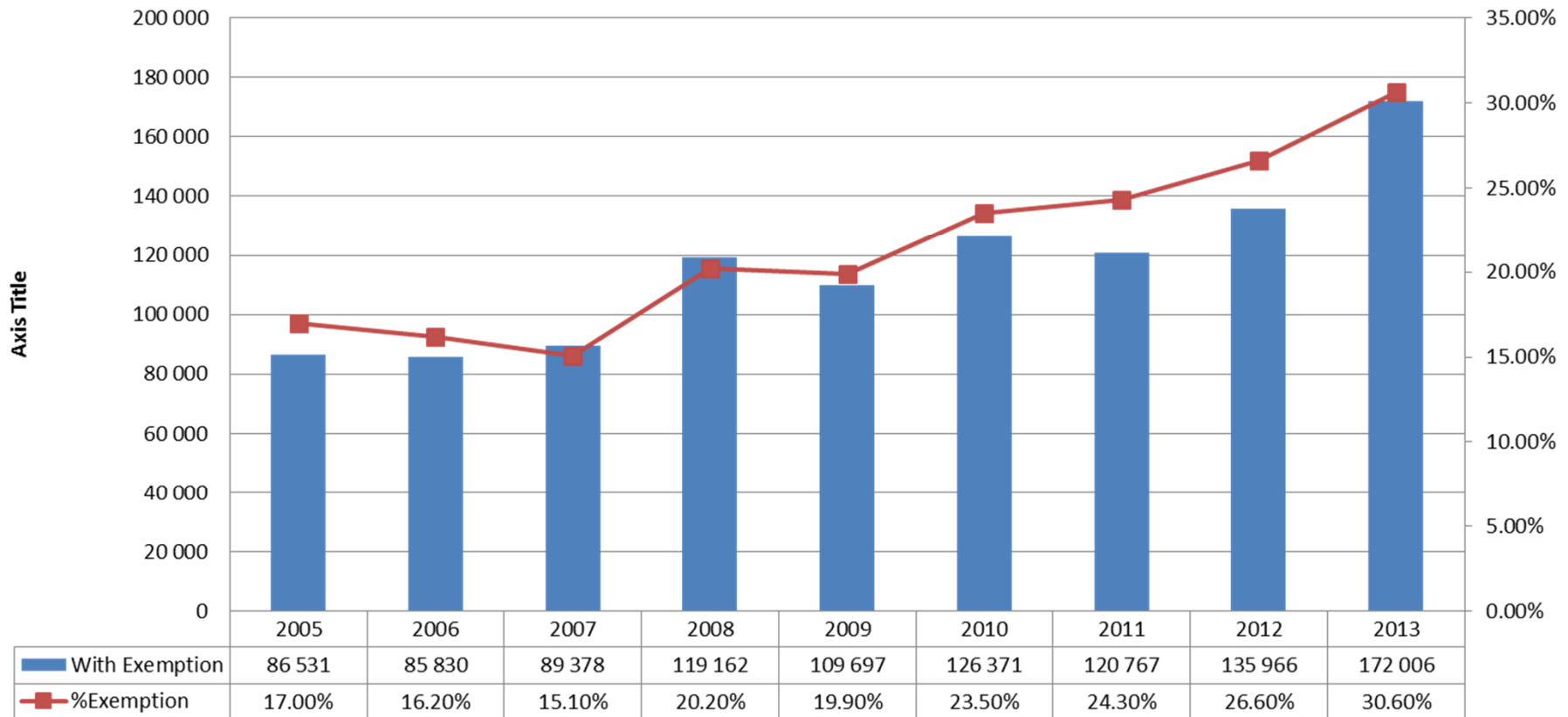
- Way forward

Background

- Umalusi is a quality council that monitors standards for general and further education and training in accordance with the National Qualifications Framework as contemplated in NQF Act, 2008

- Umalusi is also responsible for the quality assurance of qualifications registered on its sub framework, such as the SC, NSC, GETC etc.

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- QA processes
  - Moderation of the question papers;
  - Moderation of Site-Based Assessment (SBA);
  - Monitoring of the conduct of the NSC examination;
  - Verification of marking; and
  - Standardization of marks
    - Obtain equivalence of the standard of the NSC
    - in order to deliver a relatively constant product to the HE sector and to the workplace

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- National Senior Certificate examination results and HE

	2005	2006	2007	2008	2009	2010	2011	2012	2013
With Exemption	86 531	85 830	89 378	119 162	109 697	126 371	120 767	135 966	172 006
%Exemption	17.00%	16.20%	15.10%	20.20%	19.90%	23.50%	24.30%	26.60%	30.60%

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National Senior Certificate examination results and HE

Year	Mathematics				Physical science			
	Learners	>=50%	Learners	>=80%	Learners	>=50%	Learners	>=80%
2005	55 329	21.50%	6 280	2.40%	24 863	15.90%	336	0.20%
2006	58 279	18.60%	6 676	2.10%	27 525	14.40%	336	0.20%
2007	64 100	18.60%	7 558	2.20%	28 045	13.20%	317	0.10%
2008	63 658	21.10%	13 022	4.30%	33 872	15.50%	2741	1.30%
2009	53 769	17.70%	8 773	2.90%	22 649	9.70%	992	0.40%
2010	50 226	11.60%	9 525	3.60%	37 882	16.30%	5963	2.60%
2011	41 587	10.90%	5 669	2.50%	37 107	20.50%	5650	3.10%
2012	51 255	13.40%	6 599	2.90%	43 651	24.40%	5659	3.20%
2013	63 152	15.60%	8 217	3.40%	47 031	25.50%	5616	3.00%

Continued…

The purpose of NSC among others is

- to provide learners with a school-leaving certificate and

- To prepare learners for further studies

Purpose of the study

To investigate the ability of NSC results to predict the student's probability of meeting the requirements to progress into the second year of study

Research Methodology

- The pilot study was a joint study with UP, UJ and Wits.

- The study focused on the academic performance of full-time, first-time entering South African students registered in 2009 to 2012

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- The variable of interest was "*academic success*" and the independent variables were Physical Science, Mathematics and English

  - ❑ The selection of these subjects was informed by the admission requirements imposed by the South African higher education institutions.

  - ❑ The "*academic success*" was defined as students having met the minimum requirements to proceed into their second year of study.

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- The logistic regression technique was used since the outcome variable *"academic success"* is dichotomous i.e., either 0 or 1 (where the value 1 indicated success and the value 0 indicates failure)

- Each institution analyzed the data separately

- Analysis was done at faculty level

General Findings

- Irrespective of the limiting factors of the study, the NSC results still predict academic success across the three institutions, even if only to a limited extent. In particular, Mathematics and Physical Science have acted as reliable and significant predictors in faculties that are quantitative in nature across the years.

Pitfalls of using Logistic regression in this kind of study

- The outcome variable, *academic success* is based on a collection of learners performance, as a results it compromised the power of test

- Not possible to account for unknown covariates. There were a lot of unknown covariates which some were measurable and other unmeasurable

  - E.g. various interventions

- Because of small numbers analysis was done at faculty level instead of programme level.

  - Logistic regressions requires a bigger samples

Way forward

- To conduct a study that focuses on full-time first-time entering students registered at 25 institutions of higher learning in South Africa looking at:

  ❑ Performance of learners in NSC and in the access test

  ❑ Investigating the relationship between NSC and access test

Thank You