Predictive Validity of New System Admission of Chilean Universities

The Case of Engineering

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INTRODUCTION

•In Chile, since 1967 was used a system very similar to the SAT I (complemented by SAT II type-tests): PAA

•The latter was used for selection at a few selective programs offered by prestigious universities.

•In 2003, the PAA was replaced for a new system: PSU

•The PSU system was implemented without previously evaluating the impact of the change for predictive validity.

COMPARATIVE STUDY ABOUT THE PSU IN ENGINEERING CAREERS

- Sample: Data provided by the most prestigious chilean universities:
  - Universidad de Chile (UCH)
  - Universidad Católica (PUC)

- Period: 2001 – 2006

- Information Collected:
  - Academic Performance of the student on the first year of university study
  - Credit of the courses taken
  - Scores in the admission tests
  - High School grade point average
  - School of origin
  - Demographic Information (ie. Sex, Educational and Occupational attainment of their parents)
  - Quality of the School of Origin

COMPARATIVE STUDY ABOUT THE PSU IN ENGINEERING CAREERS

- Model:
  - Basic Model $y = \beta hsgpa + \delta tests + \varepsilon$
  - Model with controls $y = \beta hsgpa + \delta tests + \gamma controls + \varepsilon$

- ***y***: academic performance during the first year of universities studies

- ***hsgpa***: high school grade point average

- ***tests***: scores in the admission tests (SAT I and SAT II type tests)

- ***controls***: the rest of available information described previously

THE CASE OF SCHOOL OF ENGINEERING

- The School of Engineering at PUC:
  - 400 openings for its yearly admission process
  - Program of courses organized in two semester for the first year
  - The sample from the PUC: 2304 students (1160 took the PAA and 1144 the PSU)

- The School of Engineering at UCH:
  - 540 openings for its yearly admission process
  - Annual term for the first year students
  - The sample from the UCH: 3082 students (1531 took the PAA and 1551 the PSU)

- School of Origin

	PUC		UCH	
Types	**PAA**	**PSU**	**PAA**	**PSU**
Public	7.6%	7.5%	28.7%	28.0%
Subsidized	8.2%	10.2%	17.1%	20.2%
Private	84.2%	82.3%	54.2	51.8%

Table 1: Composition of Sample by type of School of origin

THE CASE OF SCHOOL OF ENGINEERING

- Educational Level of the Mother (proxy of SES):
  - UCH: 41% have a university education while 40% has complete high school education.
  - PUC: 56% have a university education while 23% has complete high school education

- Gender:
  - At UCH and PUC over the 80% of students are male (which reaffirms that in Chile engineering is still a career predominantly chosen by man)

- About the grades:
  - For PUC: only consider the grades from the first semester and for those mandatory subjects that were common between 2001 and 2006.

PREDICTIVE VALIDITY: CONTRADICTORY FINDINGS

	PUC		UCH	
Variables	**R^2 PAA**	**R^2 PSU**	**R^2 PAA**	**R^2PSU**
HSGPA	0.01	0.08	0.05	0.11
HSGPA+Tests	0.30	0.24	0.36	0.36

Table 2: Goodness of Fit

- No Consistency in results for both universities:
  - UCH: percentage of variance explained does not change between admission system.
  - PUC: noticeable decrease in goodness of fit (approximately 6% lower than the previous)
- The admission process of 2004:
  - 2004 was the first year of implementation of PSU tests
  - Atypical Process: Reduction in participation of applicants that mainly affected student from public school and those applicants whose graduated in previous year

PREDICTIVE VALIDITY: CONTRADICTORY FINDINGS

- The admission process of 2004 (Cont):
  - The abrupt announcement of the change in the admission system, could also have affected student that were taking the last PAA in the previous year.

	PUC		UCH	
R^2	**PAA**	**PSU**	**PAA**	**PSU**
Regression with information every year	0.30	0.25	0.36	0.36
Regression regardless years 2003-2004	0.29	0.23	0.35	0.34

Table 3: Sensitivity of R-square to 2003 and 2004

- In the second row I report the R-square for the samples (PUC and UCH) obtained for all the years excluding the years 2003 and 2004.

- R-square under the PAA system is consistently 6% higher than that reported for the PSU system. This difference is less marked for the sample from UCH.

PREDICTIVE VALIDITY: CONTRADICTORY FINDINGS

•The estimated coefficients:

Variables	PUC	UCH
HSGPA	0.23**	0.34**
PAA Leng	0.04	0.11**
PAA Math	0.07**	0.06**
PAA Hist	0.07**	0.04
PCE Math	0.29**	0.28**
PCE Fis	0.33**	0.33**

** significant at 1%

Table 4: Standardized coefficients PAA tests

Variables	PUC	UCH
HSGPA	0.24**	0.32**
PSU Leng	0.03	0.07**
PSU Math	0.19**	0.24**
PSU Sc	0.36**	0.42**

** significant at 1%

Table 5: Standardized coefficients PSU tests

• When PAA was used, mandatory tests have less importance than the others. This is associated to the scant variance that these tests have relative to the academic performance .

• In PSU system, contribution of Mathematics tests is significant → PSU, in particular in Mathematics, evaluates more content-knowledge that PAA (in the mandatory tests).

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Table 5: Standardized coefficients PSU tests

•The magnitude of the effects of high-school GPA is basically the same, for both universities, regardless of the system (PAA or PSU).

•The only test that have little significance in terms of the prediction of performance of the first year in the university are the Language Test (for each admission system).

•High school GPA has a higher weight for UCH than at PUC, and this can be associated to the schools of origin.

PREDICTIVE VALIDITY: CONTRADICTORY FINDINGS

•Controlling for SES

	PUC		UCH	
SES	**R^2 PAA**	**R^2 PSU**	**R^2 PAA**	**R^2PSU**
HSGPA + Tests + SES	0.31	0.25	0.36	0.36

Table 6: Percentage of variance explained after controlling for SES

•When controlling for SES, we have that the coefficients do not undergo important changes in magnitude or significance.

•At PUC, under both the system a PSU and PAA was an increase in the goodness of fit (around 1% for each system)

•Low variation of the coefficient and the goodness of fit of the models: student admitted are top scores in admission tests.

•Controlling for SES along with the rest of the variables, the coefficient of the model do not change significantly, which supports the relative importance of the test scores and hsgpa.

CONCLUSIONS

•PAA and PSU are useful to predict academic performance for engineering, however, PAA system allowed a better prediction of academic performance.

•The magnitude of the difference in the variance explained for the set of admission tests of the PAA and PSU system is considerable, with a loss of 6% in predictive capacity when PSU is applied (for PUC).

•The magnitude of the loss of predictive power is very large; authors in the field regard a change in 1% explained as significant (Geiser and Studley, 2001)

•The variables that have greater weight in the prediction of academic performance, are optional content tests (SAT II type tests) and high school GPA. This findings are consistent with other national and international studies (Geiser and Studley, 2001, Fischer and Repetto, 2003).

CONCLUSIONS

•The results should serve to reflect about inappropriateness of changing the admission system without having applied both types of test in parallel to allow for an assessment and comparison of the predictive capacity of both systems.

•Is important to consider the changes undergone by university curricula, to compare two types of tests when these have not been applied to the same pool of students.

•There is a need to conduct comparative analysis of both admission systems for other careers and institutions, both selective and less selective.

•It is necessary to assess the use of different instruments for different study programs, since the present findings do not support the superiority of the new PSU system.

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THANK YOU!!