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Do standardized tests predict graduate school performance?

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I. Introduction

Most graduate school programs routinely use standardized tests in order to help assess the skills and capabilities of prospective students. On the official Graduate Management Admissions Test (GMAT) webpage, for example, it is claimed that: "In repeated research studies, GMAT scores have been found to be an extremely accurate predictor of academic success in graduate management education programs. Unlike grade point averages, which vary according to the grading standards of each school, GMAT scores are based on the same standard for all test takers. So you can compare your applicants' GMAT scores directly with each other regardless of where they came from or what they studied. GMAT scores are the only admissions criteria that are consistent across time and across borders."

Nevertheless, there is still relatively scant empirical evidence linking these tests to academic performance and subsequent professional success. For instance, Owens (2007) examines the factors linked to the academic performance of over 2700 students across 22 Executive MBA (EMBA) programs during the 2002-2006 period, with a particular focus on the possible association with standardized test results these students took before joining the program. This study finds a mean correlation of about 0.64 between program grades and GMAT quantitative and verbal scores.

In addition, Wilson and Hardgrave (1995) deploy a variety of methods, including logistic regression techniques, to analyze the factors that might help predict graduate student

performance in an MBA program. This study finds evidence in favor of using standardized tests as a guide for selection; but it also acknowledges that establishing this relationship is premised on access to typical data describing students. This possibly misses important information on the attributes of students that could also be useful in understanding their performance and success.

More general reviews of the literature in this area also find in favor of using these standardized tests as a guide to admission, premised on their so-called "predictive power" on student performance. Nevertheless, recent analyses also concede that the relationship could be biased in favor of those who possess certain characteristics that favor their performance in both these tests and in academic graduate programs. These may include longer (or more recent) years in academic programs (as opposed to professionals with more work experience and therefore have been away from academia much longer), as well as strong command of English as a first language (the medium in which almost all of the standardized tests are given).¹

This short paper analyzes this issue by empirically examining the academic performance of over 300 students at a prominent school of public management in Manila, spanning its student cohorts from 2006 to 2013. In examining student performance in this management program, this study considers most of the observable student characteristics including age, nationality, and years of work experience, while also factoring the possible influence of cohort-specific effects. It finds initial evidence to support the claim that standardizes tests (in this case the GMAT) has some predictive power on student performance. However, the empirical results show that the magnitude of this predictive power dramatically declines once other variables are considered.

II. Methodology

This study uses multivariate regression analysis to examine the possible factors explaining the variation of student performance as measured by the grade point average (GPA). The main explanatory variables include students' age and years of work experience (upon entry into the program), as well as their GMAT scores.² In addition, the empirical framework introduces dummy variables for different batches of students, in order to capture possible cohort-specific effects. For example, it is possible that during a particularly difficult year in the labor market, there could be a more competitive pool of students entering the management program under

¹ See among others Kuncel and Hezlett (2007) and Dogan (undated).

² For some students who did not take the GMAT, their AIMAT scores are used as a substitute.

analysis. Ideally, in order to capture country-specific effects, dummy variables for countries of origin will also be utilized. This study uses a dummy variable for the students from Cambodia, Laos, Myanmar and Vietnam (CLMV) in order to account for this particular group of countries that has been the focus of increased recruitment by the program in recent years.

III. Initial Empirical Findings and Further Steps

The main results are summarized in Table 1. These initial results indicate that the students' standardized test scores are positively and statistically significantly linked to their performance in the program. Nevertheless, the estimated magnitude of this empirical link dramatically declines as one introduces other possible factors linked to performance into the regression model. The decline in magnitude is from an upper bound coefficient estimate of 0.465 (see Table 1, columns 2, 3) to a lower bound estimate of 0.036 for the final full regression (see Table 1, column 13).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	GPA	GPA	GPA	GPA	GPA	GPA	GPA	GPA	GPA	GPA	GPA	GPA	GPA	GPA
GMAT	0.461	0.465	0.465	0.425	0.364	0.256	0.15	-0.001	-0.039	-0.026	0.035	0.035	0.035	0.036
	(5.28)**	(5.29)**	(5.29)**	(4.80)**	(4.03)**	(2.79)**	-1.62	-0.01	-0.45	-0.39	(10.10)**	(10.11)**	(10.11)**	(10.43)**
Age		0.124	0.062	-0.155	-0.262	-0.445	-0.314	-0.352	-0.299	-0.214	-0.021	-0.021	-0.021	-0.023
		-0.48	-0.14	-0.35	-0.59	-1.02	-0.74	-0.86	-0.79	-0.73	-1.39	-1.4	-1.4	-1.5
Work Exp			0.092	0.275	0.435	0.685	0.655	0.787	0.622	0.305	0.042	0.043	0.043	0.04
			-0.17	-0.52	-0.82	-1.32	-1.3	-1.63	-1.39	-0.87	(2.33)*	(2.37)*	(2.37)*	(2.20)*
Batch15				17.192	19.933	25.087	29.759	37.012	44.141	58.551	79.337	79.249	-0.451	-0.386
				(2.67)**	(3.09)**	(3.90)**	(4.69)**	(5.96)**	(7.59)**	(12.65)**	(318.63)**	(275.30)**	-1.48	-1.29
Batch16					18.829	24.347	29.931	38.029	45.196	59.209	79.866	79.779	0.079	0.037
					(2.83)**	(3.67)**	(4.55)**	(5.89)**	(7.48)**	(12.35)**	(310.33)**	(270.97)**	-0.26	-0.12
Batch17						24.39	29.74	37.5	44.659	58.827	79.662	79.575	-0.124	-0.182
						(4.10)**	(5.03)**	(6.43)**	(8.16)**	(13.47)**	(337.86)**	(288.41)**	-0.43	-0.64
Batch18							29.292	36.892	44.117	58.425	79.718	79.63	-0.069	-0.083
							(4.39)**	(5.65)**	(7.21)**	(12.03)**	(305.65)**	(267.54)**	-0.22	-0.27
Batch19								37.11	44.286	58.636	79.787	79.699		
								(5.56)**	(7.09)**	(11.84)**	(300.29)**	(263.83)**		
Batch20									42.471	57.682	80.129	80.041	0.342	0.307
									(7.46)**	(12.69)**	(325.65)**	(280.59)**	-1.08	-0.99
Batch21										57.477	80.158	80.07	0.371	0.35
										(14.53)**	(369.80)**	(308.11)**	-1.25	-1.2
Batch22											80.043	79.957	0.258	0.25
											(342.45)**	(292.58)**	-0.83	-0.82
Batch23												-0.154	-79.853	-79.901
												-0.61	(278.14)**	(283.03)**
Batch24													-79.699	-79.694
													(263.83)**	(268.60)**
CLMV														-0.61
														(3.56)**
Constant	28.924	24.072	25.271	32.447	37.239	45.45	45.253	50.895	46.981	31.977	1.588	1.662	81.361	81.522
	(4.19)**	(1.97)*	-1.8	(2.29)*	(2.63)**	(3.26)**	(3.33)**	(3.90)**	(3.89)**	(3.39)**	(3.18)**	(3.23)**	(143.21)**	(145.62)**
Observations	331	331	331	331	331	331	331	331	331	331	331	331	331	331
R-squared	0.08	0.08	0.08	0.1	0.12	0.16	0.21	0.28	0.39	0.63	1	1	1	1
Absolute value	of t-statistic	s in narenth	PSPS											

Table 1. Regression Results

* significant at 5%; ** significant at 1%

The stability of this empirical relationship is examined further, by considering other factors, such as the students' age, work experience and the origin of a specific set of students (CLMV). The latter is considered due to the recent orientation of the program to improve its gender balance, as well as increase its representation among ASEAN nationals, and in particular those from CLMV. Further, to help account for cohort-specific characteristics, the cohort-specific variables—from "Batch15" to "Batch24"—are also included in the model. It is interesting to note here that the last two cohorts (e.g. "Batch23" and "Batch24" which represents the cohorts that graduated in late 2012 and 2013 respectively) imply a statistically significant lower intercept compared to previous cohorts, suggesting that their average academic performance is less impressive compared to previous cohorts.

Over-all these results necessitate further empirical analyses before arriving at actionable conclusions. Nevertheless, these results already show that the empirical link between standardized test scores and subsequent academic performance in the program is potentially sensitive to the characteristics of the program participants and should therefore be monitored in light of changes in recruitment strategies.

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