

Does the GMAT Matter for Executive MBA Students? Some Empirical Evidence

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I examine the relation of several factors, including the GMAT score, undergraduate background, and work experience to academic success in an executive MBA program. The GMAT score was found to have a weak, if any, relation to overall academic success for executive MBA students, although it was positively and significantly related to performance in a smaller set of first-year classes. I found work experience, particularly career advancement, to be significantly and positively related to overall program performance. The results also show some significant grade differences by gender, indicating that women performed as well or better than men with similar credentials.

Graduate Management Admission Test (GMAT) scores have long been a required part of the application process for many MBA programs, including executive MBA (EMBA) programs. But does a GMAT score reveal something that cannot otherwise be discerned about whether a given applicant will be an academic success in an executive MBA program? Simply put, for executive MBA students, does the GMAT really matter? As business schools consider whether to require the GMAT for admission to their executive MBA programs (and as an EMBA Council survey reports in 2005, increasing numbers no longer do), this question deserves serious consideration.

My purpose here is to provide some empirical evidence on the relationship between academic performance in EMBA programs and several measures which might be considered in admissions decisions, including GMAT scores, undergraduate GPA, and several measures of work experience for

executive MBA students. This study may also be used to stimulate thought and discussion among admissions directors and faculty about the criteria used in MBA and executive MBA admissions, and perhaps as a guide for other executive MBA program administrators as to what variables might be considered in their own programmatic studies. Although there are numerous studies relating to academic performance by full-time MBA students (e.g., see Adams & Hancock, 2000; Dreher & Ryan, 2004; and Yang & Lu, 2001), there is little research regarding executive MBAs. While the evidence presented here is illustrative rather than exhaustive, it indicates that the GMAT does not have a statistically significant relation to overall executive MBA program performance, once other information about the student is considered. However, the GMAT is found to have a statistically significant, positive relation to student performance in a smaller set of first-year EMBA courses, which is actually all that the Graduate Management Admission Council claims. Substantial career advancement is found to be positively related to overall EMBA program performance. Differences in grade performance between men and women are also found.

GMAT SCORES, MBA PROGRAMS, AND THE BUSINESS OF BUSINESS SCHOOLS

A high GMAT score is a definite plus, if not an outright necessity, to gain admission to many tra-

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ditional full-time MBA programs. These programs focus on individuals who wish to leave the workforce to attend graduate school on a full-time basis, usually after a few years of full-time work experience. Since GMAT scores figure prominently in some of the methods used to rank full-time MBA programs, schools are keenly interested in recruiting students who will drive their GMAT averages higher, irrespective of the predictive ability of this test with regard to student performance in the academic program or thereafter. As one author somewhat humorously commented, "Faculty know that GMAT scores aren't great predictors of success in business, but now take the irony of a selection process based on GMAT scores as a given no longer worth commenting upon" (Feldman, 2005: 217). The Graduate Management Admissions Council limits their claims for the GMAT; they caution that the GMAT score should be used as but one element of the admissions process and suggest only that the GMAT helps predict performance in MBA core courses typically taken in the first year, or midway through most graduate management programs. (See <http://www.gmac.com/gmac/TheGMAT/WhatIsTheGMAT/WhyUseTheGMAT.htm>, August 3, 2005.)

Traditional full-time MBA students are generally younger and thus are likely to have fewer career accomplishments to judge than the typical executive MBA student, and thus the GMAT score may be relatively more informative about their abilities and potential to perform. But for the typical executive MBA candidate, who is an adult learner over 30 years of age, the value of the GMAT as a predictor of performance in the EMBA program is less certain. Further, data from GMAC on all GMAT test-takers show that average GMAT scores decline with advancing age for the older students that populate EMBA programs. GMAC data from 2003–2004 show that 28–30 year olds had an average GMAT of 542; 31–34 year olds had an average GMAT of 533, 35–39 year olds had an average GMAT of 510; and 40–49 year olds had an average of 484 (GMAC, 2005, Table 5).

Regardless of how this pattern of GMAT scores declining with age may actually be interpreted, or what precisely the GMAT will predict, some prospective executive MBA students may want to be part of a class that has high GMAT scores because they value the opportunity to interact with others who have high test scores, or perhaps so that they can be recognized as part of a relatively exclusive "club" of high GMAT scorers.

Some researchers have raised concerns that standardized tests such as the GRE and GMAT may not have strong predictive validity for differ-

ent racial and gender groups (e.g., see Thayer & Khalat, 1998). This is of particular interest here because, both in this dataset and in broad industry data, there are differences in average scores by gender and race among all GMAT test-takers (GMAC, 2005, Tables 1 & 4). For example, in the industry data for 2003–2004, the overall average score for women who took the GMAT was 501; for men it was 541 (GMAC, 2005, Table 1, p. 7). In the same year, the overall average score for White (non-Hispanic) test-takers was 533, while for Asian-Americans it was 544, and for African-Americans the average was 429 (GMAC, 2005, Table 4, p. 21). Such differences in the overall data must be interpreted with care; nonetheless, they are striking.

Some Recent GMAT Trends

Demand for the GMAT is driven by admission requirements at business schools, and particularly the various MBA programs. The GMAC constructs and administers the GMAT, and has long sponsored and conducted studies that examine the predictive validity of the GMAT for all MBA degree programs that require the GMAT for admission, including full-time, part-time, and executive MBA programs. The GMAC is apparently looking to enhance their activity in the executive MBA marketplace; in July 2005, they sent out e-mail requests to schools to ask if they wished to participate in program-specific GMAC-sponsored validity studies for their executive MBA programs, in addition to the usual offering to participate in validity studies for all MBA program options.

When one considers the business of graduate business programs, the stakes are high. MBA programs can generate millions of dollars for their business schools and universities, and GMAT registrations generate millions of dollars for the GMAC. Data indicating intended program of study for GMAT test-takers over the 1999–2000 to 2003–2004 time period show that there was an increase in GMAT tests taken of 6.2% for full-time MBAs, and a similar increase of 5.9% for part-time MBA candidates. The number of "undecided" GMAT test-takers also rose markedly. Over the same time period, there was a drop in GMAT volume of 35.8% for executive MBAs, although this bigger percentage was on a much smaller base, so that the increases from full-time and part-time MBAs more than offset the declines in the executive MBAs. While these data are simply the self-reported intentions of GMAT registrants and are not binding, they appear to indicate erosion in the marketplace for the GMAT for executive MBA candidates.

Survey results from the EMBA Council also indi-

cate that fewer programs are using the GMAT as a strict admissions requirement. In 2003, 35% of programs reported that they did not require the GMAT for admissions, while in 2005 that number had climbed to 51%. While the EMBA Council surveys are voluntary and not all institutions participate, they do suggest, taken with the more comprehensive data from GMAC, that the demand for the GMAT from the executive MBA market segment is eroding. Even with these trends, in 2003–2004 more than 10,000 GMAT registrants reported that they intended to participate in an executive MBA program. With the fees for each GMAT registration now at \$250, millions of dollars are involved. However, it also should be kept in mind that overall GMAT registrations were up over the 1999–2000 to 2003–2004 time period, and with more than 192,000 total GMAT registrations in 2003–2004, the reported 10,000 executive MBA GMAT registrations are less than 6% of the total GMAT volume.

Business School Challenges and Executive MBA Programs

An interesting professional debate has simmered in recent years about the actual value of many business school endeavors, the underlying value of the MBA degree, and the process of graduate education as practiced in many business schools. For some prominent recent examples, see Pfeffer and Fong (2002) and the exchange between Connolly (2003) and Pfeffer and Fong (2003), as well as Mintzberg (2004) and the related commentary in the June 2005 issue of the *AMLE*. While much of this discussion focuses on MBA programs that, by design, require an exit from the job market to pursue full-time studies, some of the criticisms could be leveled at executive MBA programs as well. Regardless of the position one takes on such criticism, there is no doubt that executive MBA programs are an important part of the graduate degree offerings of many business schools. They are one of the key ways in which adult learners get an opportunity to return to college to pursue graduate degrees. They are also an important source of tuition revenue for many business schools (EMBA Council, 2003). The growth in prominence of executive MBA programs is also reflected in the expansion of the Executive MBA Council. This organization was established as a separate entity in 1981, and now has grown to include more than 240 member schools worldwide (http://www.embac.org/about_ourhistory.htm, August 2, 2005).

An important difference in program design between an executive MBA and a traditional MBA is that an EMBA program is designed so that the

academic degree can be completed while the students maintain a full-time job. This can be done through pursuing weekend or evening classes, or some other instructional design suited to the needs of working professionals. In this manner, EMBA programs address some (but by no means all) of the criticisms of most MBA programs leveled by Mintzberg (2004) and discussed in his response to several commentators (Mintzberg, 2005). Specifically, EMBA programs are generally comprised of practicing managers who maintain their positions while working toward their degrees. However, while one would certainly hope that the EMBA students would be able to reflect and learn from their own experiences, it is far less clear whether sufficient time is spent focusing on this in most EMBA programs to satisfy Mintzberg's (2005) criticism on this point.

Work Experience and Executive MBA Students

Although some have questioned work experience requirements for MBA students (Dreher & Ryan, 2004), executive MBA programs typically have a substantial minimum professional work experience requirement for their students; indeed, this is a key differentiating factor between a regular MBA and an executive MBA program. A survey in 2005 from the EMBA Council showed that most schools required a minimum of from 5–8 years of full-time professional work experience, with at least 4 years in a supervisory or managerial role. As a result, executive MBA students are typically between 30 and 50 years of age, with the average student in their mid-30s (Executive MBA Council, 2005). Even though the students are much older, the admissions requirements for executive MBA programs often include the same basic elements as those required of younger, more traditional full-time MBA students—in particular, a requirement to provide an acceptable GMAT score.

Accreditation and GMAT Scores

Some researchers have suggested that accrediting groups may also have some influence on business school admissions policies. As the AACSB International moves toward a mission-based accreditation process, a wider variety of schools have been accredited with lower average GMAT scores (Jantzen, 2000). It has been suggested that schools may have originally required GMAT scores to satisfy accrediting agencies and provide externally comparable evidence of rigor and even-handedness in the admissions process, and that this might aid in accreditation reviews (Wright & Palmer, 1997). Af-

ter all, the GMAT holds the promise of providing a more standardized and perhaps more comparable bit of evidence about student aptitude than an undergraduate GPA, which for a given cohort of students may come from widely different curricula and academic institutions, as well as widely differing time periods. For example, in the current dataset, there are students whose backgrounds range from journalism to nuclear engineering; they graduated with their first degrees in the 1970s, the 1980s, and the 1990s. However, while some may point to accreditation reviews as a reason to use the GMAT as part of the admissions process, it should be noted that the AACSB has no explicit rule stating that the GMAT must be part of the admissions requirements for either full-time or executive MBA students.

PREVIOUS STUDIES OF ADMISSIONS CRITERIA FOR MBA PROGRAMS

There have been numerous studies of the admissions criteria for MBA programs, and their authors have tried to identify the different criteria that might be useful indicators of success for new MBA students (see Ahmadi, Raiszadeh, & Helms, 1997; Yang & Lu, 2001). Wright and Palmer (1994, 1997) examined GMAT scores, undergraduate GPAs, and other factors that may help predict academic success for MBAs. Overall, their results showed that GMAT scores and undergraduate GPAs did not appear to adequately discriminate between high- and low-performing students in the MBA classroom. Hancock (1999) examined gender differences in the value of the GMAT to predict academic performance and found that while women scored significantly lower on the GMAT, there was no difference in performance in MBA classes. Hoefer and Gould (2000) also found some differences in MBA student performance by gender.

Adams and Hancock (2000) examined full-time work experience as an indicator of success in MBA programs, and found a significant, positive correlation between work experience and MBA performance. They also found that work experience was a stronger indicator of MBA program success than GMAT scores and undergraduate GPA. Given the relatively large amount of substantive professional work experience that prospective executive MBA students have accumulated, Adams and Hancock's (2000) results raise questions about the additional information that GMAT scores or undergraduate GPA would provide about an applicant's ability to perform in the executive MBA program. In addition to the sheer quantity of work experience, there is a question of the quality of that experience,

as indicated by career advancement and achievement. Evidence of substantial career advancement may indicate superior ability, superior discipline, motivation, or all of the above. In comparison to younger full-time MBA students, prospective executive MBA students have typically had more time to advance in their professional lives, so that their resumes and their revealed professional accomplishments may be more informative about all of their abilities than the resume of a younger person.

For adult learners in their 30s, 40s, or 50s one may want to consider whether the GMAT score is of the same predictive validity and relevance as it is for the 20-somethings who make up the majority of many full-time MBA programs. Some authors have criticized reliance on standardized test scores for graduate student admission generally (Thayer & Khalat, 1998). Others have suggested that there may be racial or gender differences in standardized test scores, and that enforcing uniform requirements for minimum standardized test scores would lead to racial or gender imbalances in the profiles of admitted full-time MBA students (Hancock, 1999). Perhaps reflecting some of these concerns, a recent benchmarking study compiled by the Executive MBA Council showed that roughly half of the participating institutions no longer make the GMAT score an admission requirement for their executive MBA students (Executive MBA Council, 2005).

For these same adult learners, there is also a question of whether their undergraduate GPA has as much relevance and informational content as it might have for younger, full-time MBA students, who may have been out of their undergraduate programs for only 2 or 3 years. For many of the EMBA students, the undergraduate GPA is more than a decade old. Thus, it seems entirely reasonable to impose a statute of limitations on holding people to account for their undergraduate behavior. Individuals who had weak undergraduate GPAs at the age of 21 may have grown and matured, and truly discovered their talents as business managers 10–20 years later. Despite less-than-stellar undergraduate GPAs, they may be excellent EMBA candidates when they are 35 or 40 years of age. The factors that may have helped them succeed in business, such as discipline, time-management skills, and dedication may well be more crucial to success in an executive MBA program than pure intellectual brilliance. These factors may be revealed by demonstrated career accomplishments as indicated in the resume and letters of recommendation, and the fact that the students, and in many cases their companies, are willing to make the substantial financial and time

investment that is necessary to complete the EMBA program.

In summary, while there has been a significant amount of research on the factors that help predict success in MBA programs, most of that work has focused on the younger students who populate full-time MBA programs. The present study provides evidence on the relationship between the academic performance of executive MBA students and a variety of measures that may be considered in admissions decisions. In particular, this study considers whether the GMAT helps predict performance beyond what might otherwise be gathered from measures of educational attainment, demographics, and professional work experience.

METHOD

Participants

Table 1 shows descriptive statistics for the variables in the dataset. Data were gathered from students in several graduating-year classes of students over a period from 1998 to 2005. All data were obtained from students in the College of Business at Auburn University, a large AACSB-accredited business school in the Southeastern United States. All of the students were attempting to move through the executive MBA program, where they

take a set of classes in a fixed progression with their cohort. Two of these students had earned their undergraduate degrees at foreign universities and did not have undergraduate GPAs comparable to the other students; since this variable was missing they were excluded from the analysis. Similarly, there were 4 students who already had earned doctoral degrees (three PhDs and one DVM) who were exempted from taking the GMAT by program policy. Since they did not have GMAT scores, they were excluded as well, resulting in a total of 180 students whose information was included in the final dataset. Auburn University also has a separate, specialized executive MBA program for physicians, but these students and their classes are not part of the regular executive MBA program and are not included in any of the analyses conducted here.

As shown in Table 1, the executive MBA students in this dataset were predominantly male (just over 80%), and 10% of the students were racial minorities. The undergraduate GPA averaged just over a 3.0, while the average student in this dataset had more than 13 years of full-time professional work experience. In addition to looking at total years of professional work experience, it is important to examine the level of professional achievement, as indicated on the resume that was submitted as part of the EMBA application process. Over 35%

TABLE 1
Descriptive Statistics and Correlation Matrix

Variable	M	SD	UGPA	Gender	Race	Engineer	Years Work Exp.	DM/VP	Pres./CEO	GMAT	Overall EMBA GPA	First-Year GPA
UGPA	3.02	0.48										
Gender	.183	.388	.13 [†]									
Race	.100	.301	-.13 [†]	.03								
Engineer	.389	.489	-.05	-.23 ^{**}	.11							
Years Work Exp.	13.8	6.5	.10	.09	.01	-.13 [†]						
DM/VP	.361	.482	.13 [†]	-.12	.02	-.05	.19 [*]					
Pres./CEO	.033	.180	-.06	.07	.04	-.15 [*]	.10	-.14 [†]				
GMAT	520.4	100.5	.03	-.32 ^{**}	.20 ^{**}	.32 ^{**}	-.11	.18 [*]	-.03			
Overall EMBA GPA	3.71	0.45	.11	.10	.02	.13 [†]	.03	.31 ^{**}	-.23 ^{**}	.12		
First-Year GPA	3.72	0.47	.15 [*]	.04	.02	.11	.08	.30 ^{**}	-.26 ^{**}	.19 [*]	.92 ^{**}	
Core 4 Class GPA	3.65	0.54	.15 [*]	.03	.00	.15 [*]	.01	.33 ^{**}	-.27 ^{**}	.20 ^{**}	.86 ^{**}	.90 ^{**}

Notes: $N = 180$. The superscripts [†], ^{*}, and ^{**} indicate that the correlations shown are significant at the 10%, 5% and 1% levels, respectively, using a 2-tailed test. The class grades used to compute the Core 4 Class GPA were Accounting, Finance, Economics, and Quantitative Methods. In addition to the Core 4, the first-year GPA typically included grades from classes in Ethics, Organizational Leadership, International Business, Marketing, and Operations. The variable for Race was equal to one if the student was non-White and zero otherwise; similarly the variable for Gender was equal to one if the student was female, and zero otherwise. Engineer was coded as a one if the student had an engineering degree, and was zero otherwise. The variables DM/VP and Pres./CEO were coded equal to one to indicate that the student had reached the level of Division Manager through Vice President, or President/CEO, respectively, and were zero otherwise.

of this dataset (65 individuals) included students who had demonstrated substantial professional achievements and responsibility, as shown by reaching a level of division manager up through vice president in their organizations, while 6 individuals had made it all the way to president or CEO of their organizations. The average GMAT score was just over 520, with a standard deviation of just over 100.

Of the 180 students in the final dataset, 8.8% (16 individuals) did not finish the degree program. Of those who did not finish, most (11) had grade problems and essentially failed out of the program; others left while in good academic standing. Another 8 students enrolled and attended some classes in the program but dropped out in the first semester before completing their assignments and earning final grades; these students were not included in the final dataset.

The Empirical Model

In the regression models developed to predict academic performance in the EMBA program, the variables should reflect a student's intellectual ability, preparation, and dedication. To perform well, students need to have the intellectual capacity to learn the material, they need to have a fundamental set of communication and analytical skills to complete the assignments, and they need to have the organizational skills and dedication to persevere when things get tough and the workload seems overwhelming. As noted in prior research regarding performance in the workplace (Blumberg & Pringle, 1982; Peters & O'Connor, 1980) these individuals also need to have a reasonable opportunity to succeed in the program; personal issues including family and health problems, demands at their workplace, or other problems can overwhelm even the best students and cause them to perform poorly in the academic program.

Variables Used in the Regressions

In the statistical models used in this study, student performance is measured by the GPA earned in the EMBA program courses. While grades may not be a perfect measure of student mastery of subject matter, in part because grade inflation can distort GPAs and also because the GPA range is restricted (Waldman & Korbar, 2004), using GPA as a performance measure follows established practice in this area; for example see Hoefer and Gould (2000) and Yang and Lu (2001). The measures of educational attainment and career accomplishment used in the regression models, as outlined below,

provide some evidence of intellectual ability, dedication, preparation, and diligence.

Educational Attainment

While student intellectual ability and preparation are observed imperfectly, previous research has used standardized test scores and prior grades to provide such information (e.g., see Bertus, Gropper, & Hinkelmann, 2006; Caudill & Gropper, 1991; Hancock, 1999; Koys, 2005). Following prior research, undergraduate GPA is incorporated in an attempt to capture some information regarding student intellectual ability and preparation. This variable is expected to have a positive effect on student performance, and thus the coefficient is expected to have a positive sign in the estimated regressions.

As noted earlier, the students in this program came from a wide variety of educational backgrounds, which vary greatly in their quantitative preparation. Nearly 40% of these EMBA students had undergraduate degrees in engineering. They not only typically have a strong quantitative background, but in addition, the difficulty of many engineering undergraduate programs is such that a lower GPA in such programs may be more impressive than a higher GPA in another area of study. To determine whether engineers performed better than students with other backgrounds, a dummy variable to indicate that the student had such an undergraduate background was created, with a value of 1 if the student was an engineer, and zero otherwise. This procedure was followed in prior research in economics classes (Caudill & Gropper 1991); consistent with those findings, it is expected that this variable will be positive.

Demographic Variables

Variables indicating race and gender were also added to examine issues raised in prior research. Given the mixed results of previous studies (Hancock, 1999; Hoefer & Gould, 2000) and the fact that the admission process here was not designed to favor any particular gender or racial and ethnic background, the coefficients on race and gender are expected to be zero.

Work Experience and Career Advancement

Work experience is a key admission factor for executive MBA programs; as mentioned earlier, one of the key distinguishing factors between an executive MBA and other MBA programs is the requirement for a substantial amount of profes-

sional work experience. The overall years of professional work experience was included as one variable in the regression model. As a measure of substantial professional advancement, the variable division manager-vice president (DM/VP) was created. This variable was coded as a 1 if the individual had reached a rank of division manager up through vice president in their firm; it was zero otherwise. Similarly, a variable to indicate that the individual had reached the rank of president or CEO in the organization was created. These two variables are designed to reflect substantial career accomplishments. It is expected that all three measures of work experience and professional accomplishment would have positive signs in the estimated regressions.

GMAT Scores and Comparability With Overall Industry Data

Of primary interest in this study is whether GMAT scores reveal anything about EMBA student capabilities and subsequent program performance beyond what might otherwise be discerned from the other measures of prior education and professional accomplishments. Thus, the GMAT score is added in the third step of the regression models, after the education and experience variables. The sign of the coefficient on this variable is expected to be positive.

One of the difficulties in using the GMAT as a variable in such regressions and trying to draw conclusions is that in many cases, one would never get a chance to observe how students with a wide range of scores would actually perform. Of interest is that in this program there is the opportunity to study the performance of students who most likely would not have been admitted to the full-time MBA program because of the greater importance of GMAT scores in that process. This dataset included 39 individuals (21.7% of the observations) with GMAT scores below 450; during this same time period no individual with a GMAT score below the upper 400s was admitted into the full-time MBA program at this university. Thus, this dataset gives us a window to see how students with lower GMAT scores could perform. In other cases, they might never have had the opportunity to succeed in classes, even if they were able, because they would not have been admitted to the program.

Overall industry data from the GMAC show an average GMAT score ranging from a low of 486 to a high of 514 (with a standard deviation of about 100) over the 1999–2000 to 2003–2004 time period for test-takers reporting that they intended to study in an

executive MBA program (GMAC 2005, Table 6, p. 27). These broader industry data show slightly lower averages than the EMBA students in the dataset used here, but they are generally comparable. However, it should be recognized that some of the individuals who took the GMAT may not have been admitted or enrolled in any EMBA degree program, and thus the average GMAT score of actual EMBA students would likely be higher than that of all test-takers.

RESULTS AND DISCUSSION

Correlations

Correlations between the variables used in the regressions are shown in Table 1. No surprise is that there are very high, statistically significant correlations between the three alternative measures of grade performance in the EMBA program; the correlations between the Core 4 GPA, First-Year GPA, and Overall EMBA GPAs are all .86 or above. The correlation between GMAT and Overall EMBA GPA was not statistically significant, although there were significant, positive correlations between the two narrower measures of grade performance. Of interest is that this correlation strengthens in magnitude and statistical significance (from $r = .17$, $p < .05$ for First-Year GPA, to $r = .19$, $p < .01$ for Core 4 GPA) as one moves from looking at broader to more narrow sets of classes in the executive MBA program. GMAT was also significantly and negatively correlated with being non-White and female.

Having an undergraduate engineering degree was positively correlated with GMAT, and negatively correlated with being female and Pres./CEO. The variable DM/VP was positively correlated with the variable for years of work experience and GMAT, and positively correlated with all three measures of EMBA grade performance. While DM/VP was positively correlated with the three different measures of EMBA grade performance, the variable Pres./CEO was negatively correlated with the same grade performance measures.

Multiple Regression Results

Three sets of hierarchical regression equations were estimated, using three alternative GPA measures as the respective dependent variables, resulting in nine regression equations reported in Table 2. The hierarchical regressions proceeded in three steps. The first step included demographic and prior educational attainment variables, while

the second step included measures of professional work experience and career advancement, following both the chronological order and logical grouping of these two sets of variables. The third and final step added the GMAT score. The performance measure of primary interest is the GPA in the entire EMBA program, as measured by Overall EMBA GPA, and those results are presented in the first section of Table 2. In addition to the overall program GPA, two other measures of grade performance are examined. First-Year GPA and Core 4 GPA were also investigated, to allow examination of students' performance as they progress through the program, and those results are presented in the second and third sections of Table 2, respectively. The four classes for the Core 4 GPA included Accounting, Economics, Finance, and Quantitative Methods. While most administrators and faculty are interested in overall programmatic performance, it is important to note that the Graduate Management Admissions Council only claims that the GMAT is a valid predictor of student performance in the core first-year courses of the graduate business program, and these alternate models allow evaluation of this claim. Several patterns emerge from the various model specifications and are discussed below.

Educational Background and EMBA Grade Performance

In only the most basic specification (Model 1) for the narrower measures of student grade performance (First-Year GPA and Core 4 Class GPA) was Undergraduate GPA statistically significant. However, in the Model 1 specifications where the UGPA variable was positive and significant at the 5% level, the overall F was not significant at the 5% level and the adjusted R^2 was less than 3.0%. In none of the regression models that included career advancement variables was UGPA statistically significant. This suggests only weak evidence that undergraduate GPAs are good predictors of EMBA grade performance, which may not be surprising given the fact that for the average EMBA student in this dataset their undergraduate GPA is more than a decade old.

The variable Engineer was positive and significant in the Overall EMBA GPA regressions (at the 5% level in Models 1 and 2 but only the 10% level in Model 3), and it was positive and significant in Models 1 and 2 for the Core 4 Class GPA as well. This is consistent with the casual observation that people with undergraduate degrees in engineering tend to do well in the EMBA program. This may

TABLE 2
Regression Results of Executive MBA Student Performance

Variable	Overall EMBA GPA			First-Year GPA			Core 4 Class GPA		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
UGPA	.107	.051	.047	.156*	.099	.092	.152*	.094	.088
Gender	.119	.177*	.196**	.053	.102	.141 [†]	.052	.113	.147*
Race	.016	.008	.027	.023	.017	.056	-.001	-.008	.028
Engineer	.157*	.158*	.132 [†]	.126 [†]	.124 [†]	.070	.171*	.166*	.117
Years Work Exp.		-.018	-.010		.043	.060		-.030	-.014
DM/VP		.313**	.295**		.265**	.229**		.313**	.282**
Pres./CEO		-.172*	-.179*		-.206**	-.221**		-.199**	-.213**
GMAT			.085			.175*			.156*
Overall F statistic	2.006 [†]	5.376**	4.838**	1.839	4.938**	5.014**	2.300 [†]	6.054**	5.873**
Adjusted R^2	.022	.146	.146	.018	.133	.152	.028	.165	.179
R^2 Change		.135	.005		.127	.023		.148	.018
F Change		9.461**	1.113		8.745**	4.785*		10.556**	3.893*

Notes: $N = 180$. The superscripts [†], * and ** indicate that the standardized beta coefficients shown are statistically significant at the 10%, 5% and 1% levels, respectively. The class grades used to compute the Core 4 Class GPA were Accounting, Finance, Economics, and Quantitative Methods. In addition to the Core 4, the First-Year GPA typically included grades from classes in Ethics, Organizational Leadership, International Business, Marketing, and Operations. The Overall MBA GPA included all the first-year classes, and added the grades from the remaining courses, which typically included required courses in Strategy and Managing Organizational Change, and a variety of electives. The variable for Race was equal to one if the student was non-White and zero otherwise; similarly the variable for Gender was equal to one if the student was female, and zero otherwise. Engineer was coded as a one if the student had an engineering degree, and was zero otherwise. The variables DM/VP and Pres./CEO were coded equal to one to indicate that the student had reached the level of Division Manager through Vice President, or President/CEO, respectively, and were zero otherwise. As an assessment of the degree of multicollinearity present, Variance Inflation Factors were checked for each of the coefficients in these models. The maximum value for any of the VIFs was 1.36, indicating that multicollinearity was not too serious a problem.

be due to the nature of their prior education, particularly the quantitative, problem-solving orientation, or to the fact that these students may be particularly motivated to earn a business degree to help complement their prior skills and help them advance in their careers, or to a selection process at their workplace that identified them for advancement among their engineering peers. These possibilities represent an open question deserving of further study.

Race and Gender

Student race was never statistically significant in any regression at even the 10% level, despite the significant negative correlation with GMAT found in the raw data. However, as found in some prior studies, there are some statistically significant differences between males and females. In the Overall EMBA GPA regressions, the variable indicating female gender was statistically significant and positive in Models 2 and 3. This indicates that women tended to perform better than men with similar measured characteristics in the EMBA program. The magnitude of this effect was just over two tenths of a grade point in their cumulative GPA. However, the variable indicating female gender was statistically significant only in Model 3 of the First-Year and Core 4 GPA regressions, and only at the 10% level in the First-Year GPA regression.

While the evidence found here on gender differences is not as strong as that for career advancement, it is nonetheless intriguing. Perhaps there are selectivity processes at work that bring more highly motivated or more capable women into the EMBA degree program. Perhaps the design of these programs to accommodate the schedules of working professionals brings out these gender differences. Perhaps this is merely an artifact of this particular dataset and analysis, which would not be found more broadly across all EMBA programs. Regardless, it is an interesting result worthy of additional investigation.

Work Experience and Career Advancement

Adding the series of experience variables invariably improved the explanatory power of the regression models. In each case, the R^2 change rose by more than .10, and the corresponding F statistics for those changes were statistically significant at the 1% level. Total years of work experience, while a consistent requirement for most executive MBA programs, was not statistically significant in any of the model specifications. However, the vari-

able used as a measure of career achievement, DM/VP, was positive and statistically significant in every regression model. This indicates that individuals who had reached this level of division manager up through vice president did significantly better in the EMBA program than those who had not advanced to that level. This may be due to the fact that their career progression identifies these people as high achievers, and they may be expected to distinguish themselves in their EMBA program, as well as at work. It also may be that these are the people who are at the ideal stage to excel at their EMBA studies. They bring a wealth of experience and knowledge to the program, and thus tend to stand out among their peers in class. It also may be that these are people who have a great deal to gain by completing their degree to help them advance to the highest levels in their organization or elsewhere.

Also of interest, those few who had advanced to the highest level in their organizations, as indicated by the variable Pres./CEO, performed worse in the EMBA program. This variable was negative and statistically significant in all three measures of grade performance. While one must be careful about generalizing based on the experiences of the very small numbers (6) of these individuals in this EMBA program, the results are not surprising. Freeing up the time to complete a 2-year executive MBA degree program is exceptionally difficult for these individuals. Two of the six individuals who were presidents or CEOs earned poor grades and did not finish the EMBA program. The demands on their time (and the takeover of one company) apparently led to them not performing well in the classes for which they were registered, and ultimately, to being dismissed from the program. In addition to the extraordinarily high opportunity cost of their time, there is some question about what benefits would accrue to someone who was already a president or CEO. In relative terms, it would seem that those individuals at lower ranks would likely experience higher additional career benefits from completing the executive MBA degree. These factors, in part, may help explain the relative popularity of short, nondegree executive education programs for company presidents and CEOs.

GMAT Scores and Executive MBA Performance

The GMAT score, while positive, is not statistically significant in the Overall EMBA GPA model. When the GMAT score was added to the education, demographic and career achievement variables in the Overall EMBA GPA regression Model 3, it did

not add significantly to the explanatory power of the regression. The R^2 change was only .005, the F statistic for the change was not statistically significant, and the adjusted R^2 did not change at all from Model 2.

However, when one considers the regressions for the First-Year and Core 4 GPA, which correspond more closely to the claims that GMAC makes for the GMAT, the results differ. In the First-Year GPA regression Model 3, GMAT is positive and significant; the R^2 change from Model 2 was .023, and the F statistic of 4.785 for the change was significant at the 5% level. A similar result was obtained for the Core 4 Class GPA. The GMAT was positive and statistically significant with an R^2 change from model 2 of .018, and the F statistic of 3.893 for the change was significant at the 5% level. Thus, even though GMAT does not help predict overall program performance, the GMAT does appear to significantly help predict grade performance for executive MBA students in the traditional first-year core classes, beyond what is predicted by the education and experience variables.

SUMMARY AND CONCLUSIONS

The evidence found here suggests that the GMAT score is not statistically significantly related to overall academic performance for executive MBA students, but that it is significantly related to performance in a smaller set of classes typically taken in the first year of the EMBA program. These results support the contention of the Graduate Management Admission Council that the GMAT score is a valid predictor of success in the first-year core MBA courses. It also suggests that if one is interested in putting together a class of executive MBA students who could do well in the overall program, the GMAT may not matter as much, particularly once the professional accomplishments of the candidates are considered.

I found some measures of work experience and career advancement to be significantly related to overall EMBA program performance. Although the simple quantity of years of full-time work experience was not significant, substantial career accomplishment was found to be strongly related to overall success in the EMBA program, although those who have made it to the rank of president or CEO in their organizations may have difficulty doing well, perhaps because of the problems in freeing the time necessary to successfully complete a 2-year degree program. These results suggest that the emphasis that many EMBA programs place on substantial career accomplishment may manifest

itself in better student performance in the EMBA program, as well as in better class discussions.

I also found evidence to suggest that holding other factors constant, women tend to perform as well or better than men in the EMBA program. No statistically significant differences were found by race.

There are limitations to this study that should be recognized. First, as with many other studies of this type, the data are taken from students at a single university, although the highly detailed, sensitive nature of the data used here makes this almost inevitable. However, it should also be recognized that combining student grade data from many universities would raise several important complicating issues, including potential differences in grading standards, program cultures, curriculum design, and program focus, among others. Second, the inherent selectivity on the adult student's part to apply to a program that will require a significant monetary and time commitment will deter many individuals who may not believe, perhaps quite rightly, that they can succeed in the program. It is also important to note that the inherent selectivity in the admissions process, which includes judging a record of career advancement and achievement, personal interviews, and recommendations, biases downward the likely measured marginal impact of such factors as the GMAT score or undergraduate GPA in predicting performance among those admitted into the program. While three alternate measures of grade performance are used, grades are an imperfect measure of student performance. The range restriction inherent in GPAs may make it difficult to uncover all of the performance differences among students, although some differences can be discerned.

In addition, although data were gathered from several different cohorts across several years, there are a limited number of students. As more data become available, the power of the statistical tests will grow, and results that are not presently statistically significant may become so. Of course, additional data may show different patterns, which may change the parameter estimates as well. Other measures of work experience and career achievement should be explored, perhaps including such indicators as number of people supervised, amount of budget for which the candidate is responsible, or current salary. These measures were not uniformly available in this dataset, but may represent reasonable alternative measures of career achievement to investigate further the results found here. In addition to ability, each student also needs to have a realistic oppor-

tunity to do well in the program. While planning and preparation can enhance such an opportunity, it also simply requires some luck to avoid potentially overwhelming family or professional issues, such as illnesses and deaths, or corporate mergers and bankruptcies. Random problems will arise with some EMBA students, and no admissions process or performance study will be able to account for all possibilities. Finally, care must be exercised in applying these results to other executive MBA programs that may have a different academic emphasis. For those programs, the GMAT or undergraduate GPA may have different predictive ability.

The gender differences that are found here are interesting and deserving of further investigation. They are consistent with the findings of some prior researchers who examined traditional full-time MBA programs. As larger numbers of women accumulate more experience at higher management levels, executive MBA programs represent an increasingly important way that these professional women can earn an advanced business degree, while maintaining their full-time careers and balancing all of the demands on their time. The results found here suggest that these women can perform as well or better than the men with similar credentials in an executive MBA program.

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