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Manager education and mutual fund performance

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Abstract

This paper examines the relationship between manager education and mutual fund performance, following Chevalier and Ellison [Chevalier, Judith, Ellison, Glenn, 1999. Are some mutual fund managers better than others? Cross-sectional patterns in behavior and performance. Journal of Finance 54, 3, 875–899]. We refine their analysis by investigating if the quality of the MBA program, as measured by the mean GMAT score and *Business Week* ranking, has any effect on performance. We find that the mean GMAT score of the MBA program is positively and significantly related to fund performance. Managers who hold MBAs from schools ranked in the top 30 of the *Business Week* rankings of MBA programs exhibit performance superior to the performance of both managers without MBA degrees and managers holding MBAs from unranked programs. We also find that other education variables, such as whether the manager attained a CFA designation or holds either a non-MBA masters-level graduate degree or Ph.D., are generally unrelated to mutual fund performance.

Keywords: Mutual fund performance; GMAT; Manager education; CFA

1. Introduction

Does an MBA matter? In terms of salary, the answer is obviously yes, as the average MBA earns 71.9 percent more than his or her pre-business school salary.[2] But in terms of mutual fund management, the finance literature is divided when it comes to the value of a graduate business education. In the first paper to examine this issue, Golec (1996) examines whether mutual fund

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[2] See Hindo (2002).

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managers with MBAs have better performance than fund managers without MBAs. He finds evidence consistent with the idea that the MBA does, indeed, improve fund performance. However, his study is subject to a strong survivorship bias as it backfills mutual fund data, which results in the exclusion of many non-surviving funds. In a more comprehensive study of mutual fund performance that is robust to expenses, risk, and to some degree, survivorship bias, Chevalier and Ellison (1999a) find that while fund manager performance is significantly and positively related to the mean composite SAT scores of the institutions at which fund managers completed their undergraduate degrees, there is no difference in the performance of managers who hold MBAs versus those who did not. Hence, their results suggest that mutual fund performance is unrelated to whether the manager holds an MBA.

In this paper we further examine the relationship between manager education and fund performance. Our approach extends and differs from Golec and Chevalier and Ellison in several ways. First, similar to the approach used by Chevalier and Ellison, we examine the mean composite SAT scores for the undergraduate institution attended by the manager. However, we extend this analysis by also examining the mean composite GMAT score of the MBA program from which the manager graduated. Thus, in addition to an analysis of whether MBA managers perform differently than other managers, we specifically document if the quality of the MBA program attended (as measured by the GMAT) affects fund performance. Interestingly, we find evidence that the quality of the school where the manager received his or her MBA degree is significantly related to fund performance. More specifically, we find that managers holding MBAs from high-GMAT programs exhibit performance that is superior to the performance of both managers without MBA degrees and managers with MBA degrees from low-GMAT programs.

Second, we examine funds over a sample period in the early 2000s in which the stock market was generally not in a bull market. This is in contrast to Chevalier and Ellison who examined a period during which the market was relatively bullish (1988–1994). This is an important difference as one criticism of Chevalier and Ellison is that their results are simply an artifact of the time period they test. Indeed, a *Forbes* article criticizes one of Chevalier and Ellison's findings – that younger managers perform better than older managers – by stating that:

> "The time period the professors used, 1988 to 1994, was a roaring bull market. The kids, with their short memories, would naturally tend to be more aggressive than the graybeards. (Investment genius, as they say, is a short memory in a bull market.)"[3]

In this paper we examine if such criticism is valid as our sample is from a decidedly non-bull-market period.

Third, unlike Chevalier and Ellison, we also examine if other characteristics of the education of the manager have an effect on mutual fund performance. Specifically, we examine the relation between mutual fund performance and whether the manager's undergraduate degree is from a liberal arts school; whether the manager holds the Chartered Financial Analyst (CFA) designation; whether the manager completed another masters-level graduate degree besides (or in addition to) an MBA; and whether the manager completed a Ph.D. In general, we find that managers with these additional types of education perform no differently than other fund managers.

Fourth, we construct a "follow-the-money" sample of funds in which we assume we are an investor who bases his or her decision to invest in mutual funds upon the educational profile of the fund manager which is available from Morningstar and other databases. We identify a sample of funds that meet certain criteria and follow their performance during an out-of-sample period.

[3] Dreman (1997).

Funds that liquidate, merge, or change managers before the end of the out-of-sample period are then assumed to take on the returns of the "closest" surviving fund in the sample for the period in which the fund disappeared. To select the "closest" surviving fund, we use an algorithm similar to that of Loughran and Ritter (1997) that matches the disappeared fund to the closest surviving fund by using fund characteristics such as style, expenses, turnover, size, and manager education.

Using these specifications, we find several interesting results. We find that the mean GMAT score of the MBA program that the fund manager graduated from is positively and significantly related to fund performance over the 2000–2003 period. More specifically, managers who hold MBAs from schools ranked in the top 30 of the *Business Week* rankings of MBA programs exhibit performance superior to the performance of both managers without MBA degrees and managers holding MBAs from unranked programs. In addition to this result, we also find that other education variables, such as whether the manager attained a CFA designation or holds either a non-MBA masters-level graduate degree or Ph.D., are generally unrelated to mutual fund performance.

The rest of the paper is organized as follows. Section 2 describes the data while Section 3 provides the methodology. Section 4 contains the results, Section 5 provides some discussion of our results, and Section 6 presents our conclusions.

2. Data

To facilitate the description of the data, this section is divided into four subsections: fund selection criteria; the out-of-sample evaluation period; manager changes, liquidations and mergers; and education data.

2.1. Fund selection criteria

To select funds we use the January 2000 Morningstar Principia data disk. This disk provides data for all funds available as of December 31, 1999.[4] From this disk we select all actively managed funds open to new investment that are within each of the following five Morningstar "prospectus objectives": aggressive growth, equity-income, growth, growth-income, and small company. We also require that each of these funds had monthly return as well as turnover, expense, fund size and manager education data as of December 31, 1999.

From this group of funds, we further narrow the sample by selecting those funds with only one manager, where the manager received an undergraduate degree from a U.S. college or university. This resulted in a sample of 518 funds.[5]

[4] We note here that all funds in our sample are publicly available as of December 31, 1999. This is a requirement of a fund being listed on the Morningstar data. As a result we avoid the incubation issue as described by Evans (2005) in which the return data for a fund may be reported prior to the time it becomes publicly available. Of course if we used in-sample returns, i.e., returns of the funds prior to December 31, 1999, our data may have been subject to this incubation bias as we cannot guarantee that the fund was truly publicly available during its entire history before being listed on Morningstar.

[5] We only use the oldest share class listed to prevent double or triple counting a single fund. Specifically, on the January 2000 Morningstar data disk (data as of December 31, 1999), there were 2946 funds domestic equity funds that had turnover, expense, and fund size data. Of these funds, 1419 dropped out of the sample due to elimination of multiple share class funds, and 64 funds dropped out because they were index funds. Of the remaining funds, 830 dropped out they did not have manager education data. Finally, 115 of the remaining funds were dropped as the fund had more than one manager.

For each of the 518 funds, we then extract from the January 2000 Morningstar disk all of the available manager information. This includes the manager's tenure; the manager's educational background, i.e., when and where the manager received his or her undergraduate and graduate degrees; and whether the manager holds a Chartered Financial Analysts (CFA) designation. Similar to Chevalier and Ellison, we create a manager age variable by assuming that each manager was 21 years old upon receiving his or her undergraduate degree. We also extract fund characteristics, including the net assets, expense ratio, turnover ratio, and loads for each of the 518 funds.

2.2. The out-of-sample evaluation period

We next examine the out-of-sample performance for the subsequent 4-year period, 2000–2003, for each of the 518 funds. As a robustness, check we also examine the out-of-sample performance over three smaller subsets: January–December 2000, 2000–2001, and 2000–2002.

Using the January 2001–2004 Morningstar data disks, which report data as of December 31st of the previous year, we obtain the monthly returns for each fund for the period 2000–2003. These monthly returns account for management, administrative, 12b-1 fees, and other expenses automatically deducted from fund assets. However, they do not account for loads or brokerage fees.

From each of these four disks (2001–2004), we also obtain the expense ratio, turnover ratio, and net assets for each fund. The average of the four post-2000 observations is then used to form the out-of-sample variable. For example, the out-of-sample expense ratio of a fund is the average of the expense ratio observations for the fund from the 2001–2004 disks.

2.3. Manager changes, liquidated and merged funds

Obtaining the out-of-sample returns requires a simple extraction of the fund's returns from the January 2001–2004 Morningstar Principia data disks. However, a number of funds changed managers, were liquidated, or were merged into other funds during the out-of-sample period. In this section, we describe how we handle these problematic funds.

For manager changes we proceed as follows. If the fund manager changes during the out-of-sample period, we first determine the approximate date when the manager changed[6] by using quarterly Morningstar data disks for the period 2000–2003. After the managerial change, the fund returns are equal to the returns of the "closest" surviving fund from the annual Morningstar data disk during the year when the fund manager disappeared. For example, if a fund manager changed in February 2001, the closest surviving fund is chosen from a sample of funds from the January 2001 Morningstar data disk (data as of December 31, 2000). Likewise, if a fund manager changed in February 2003, the closest surviving fund is chosen from a sample of funds from the January 2003 Morningstar data disk (data as of December 31, 2002).

To select the "closest" surviving fund, we use an algorithm similar to that of the seasoned equity and initial public offering literature (e.g. Loughran and Ritter, 1997), which matches the fund with the manager change to the closest surviving fund by using fund characteristics such as

[6] It could be argued that if managers are looking to leave a fund, the performance of the fund will be influenced prior to the manager leaving the fund. Hence, we should not examine the performance of the manager immediately before the manager leaves. However, since it is difficult to determine when a fund manager might start to look for a job elsewhere, we examine fund performance up to the time the manager leaves the fund.

style, expenses, turnover, size and manager education. A detailed description of the algorithm is presented in Appendix A.

For funds that merge or are liquidated, we use a very similar approach. First, we use the Morningstar data and *The Wall Street Journal* to ascertain the month of the fund merger or liquidation. If the month of the merger cannot be obtained from these sources, we telephone the individual mutual fund companies and request the relevant information. After a fund has merged into its partner fund or liquidated, we use the same procedure as described in Appendix A. That is, we find the surviving fund that most closely matches the fund that drops out of the sample.

In total, 275 out of the 518 funds in our sample eventually dropped out of the sample due to manager changes, mergers, or liquidations. Approximately 72 percent of the funds that dropped out were due to manager changes with the remaining due to mergers or liquidations. In terms of the timing of the dropped funds, 99 of the funds dropped out during the year 2000, 70 dropped out in the year 2001, 54 in 2002, and 52 in 2003.[7]

Note that the out-of-sample expense ratio, turnover ratio, and net assets described in Section 2.2 are also calculated slightly differently for funds that had a manager change, merged, or liquidated. Specifically, missing annual observations are replaced with the values of the surviving fund that is closest in terms of fund characteristics (using the algorithm described above and in Appendix A). For example, a fund that was liquidated in February 2003 has expense ratio observations for the January 2001, January 2002, and January 2003 disks, and the expense ratio observation for January 2004 (data as of December 31, 2003) is equal to the expense ratio of the surviving fund that was closest in terms of fund characteristics.

Finally, note that we also implemented, but do not report, an alternative method for dealing with manager changes, liquidations, and mergers that produced relatively similar results to the method described above.[8] Specifically, instead of using the data for the closest fund in terms of fund characteristics, we assume the investor randomly re-invests into one of the other surviving funds of the same prospectus objective. Hence, the out-of-sample returns after the month of the manager change/liquidation or merger are the equally weighted averages of the returns of all the other surviving funds of the same prospectus in our sample. The results using this methodology are available upon request.

2.4. Education data

2.4.1. SAT

To obtain up-to-date SAT scores for every undergraduate school listed in our sample of 518 funds, we first search Collegeboard.com for the SAT I Verbal and SAT I Math test score ranges for the middle 50 percent of first-year students.[9] The mean values of the verbal and math score ranges are calculated, and the average of the verbal and math scores is calculated to identify a

[7] Since the proportion of funds that drop out of the sample is significant, we repeated our tests for the sample of 243 funds that survived the entire sample period. The results were very similar to the results reported in Section 4. Specifically, we find that managers with MBAs from higher GMAT schools perform significantly better than other managers and that the CFA designation is not related to fund performance. These results are available upon request.

[8] The only exception is that with this alternative method we found that the mean composite SAT score of the undergraduate institution of the fund manager was positively and significantly related to fund performance at the 10 percent level. In the method using the closest surviving manager, we did not find that the SAT variable was significantly related to fund performance.

[9] Collegeboard.com is the website of the College Board, the organization that administers the SAT tests, among other activities. The search was performed December 2003.

single SAT score for each school. For all schools for which SAT scores were not identified on Collegeboard.com, we then search the Princeton Guide to Colleges (2004) for mean SAT scores. For a select few schools, SAT scores are unavailable. In these cases, if ACT scores are reported, the ACT scores are converted into SAT scores using the SAT–ACT score comparisons provided on Collegeboard.com.[10]

2.4.2. GMAT

To obtain GMAT scores for all the MBA schools attended by the managers of the 518 funds, we first search MBA.com for the mean GMAT score of new entrants.[11] For all schools for which GMAT scores are not identified on MBA.com, we then searched the *2003 Full-time MBA profiles* from Businessweek.com for the mean GMAT scores. For all schools for which GMAT scores are not identified on either of the above two sources, we search Peterson's Guide to MBA Programs (2004) for the mean GMAT scores.[12]

2.4.3. Other educational variables (LIBERAL ARTS, CFA, OTHERGRAD, Ph.D.)

We obtain other educational variables in addition to SAT and GMAT scores. These include the following:

- Using the 2004 list of liberal arts colleges of USnews.com, we determine whether the manager's undergraduate institution is a liberal arts college or not. We choose this variable since many educators argue that the individual attention given to students at liberal arts schools is superior to that in larger, research-oriented institutions.
- The Morningstar database provides information on whether the manager holds a Charter Financial Analysts (CFA) designation, has a master's degree other than an MBA, or holds a Ph.D. We create the dummy variables CFA, OTHERGRAD, and Ph.D. to determine if these types of education have any effect in explaining fund performance.

2.4.4. Changes in rankings over time

The mean test scores for both undergraduate and graduate institutions are from December 2003. One issue this creates is that quality of some schools may have changed since the manager attended the school. For example, the mean age of a manager in our sample is 47 years, meaning that most managers received their degrees some 20 or so years earlier than when we sample the education data. To test for any possible changes in the relative quality of the schools we acquired the mean SAT test scores for all undergraduate schools as of 1983 and the mean GMAT scores for all graduate business schools from 1984.[13] We then use a Spearman's ρ rank correlation test to examine whether the relative rankings, based on the mean test scores of the schools in our

[10] For a few funds, more than a single undergraduate school is reported. In these cases, the SAT score identified is the average of the SAT scores for the individual schools. Further, note that for a few of the funds, the undergraduate school reported is actually a system of schools. In these cases, the SAT score identified is the average of the SAT scores for the schools within the system for which SAT scores are reported on Collegeboard.com.

[11] MBA.com is the website of the Graduate Management Admission Council, the organization that administers the GMAT tests. The search was performed December 2003.

[12] As for the SAT scores extraction, more than one graduate school is reported for a small group of fund managers, and the graduate school reported is occasionally a system of schools. In these cases, we proceeded in an identical fashion as described above for SAT scores.

[13] We obtain the SAT data from Lovejoy's College Guide (1983) and the GMAT data from Barron's Guide to Graduate Business Schools (1984).

sample, had significantly changed between the early 1980s and 2003. We find that the rankings of undergraduate institutions and graduate business school in the early 1980s are very similar to those in 2003, although not perfectly correlated. Specifically, we find a correlation coefficient of 86.15 percent between the 1983 and 2003 SAT rankings, and a correlation coefficient of 82.11 percent between the 1984 and 2003 GMAT rankings, significantly different from zero at the 1 percent level. These results are similar to the results reported by Dechev (1999) who finds that changes in *Business Week* and *U.S. News and World Report* graduate business school rankings are mostly transitory.

3. Methodology

To measure fund performance we use three performance metrics that are widely known in the literature and in the industry:[14] The mean monthly excess returns, the Fama–French–Jagadeesh–Titman–Carhart 4-index alpha,[15] and the Ferson and Schadt (1996) conditional alpha. The mean monthly excess returns and 4-index alpha are used by Chevalier and Ellison and are common measures of performance. The conditional alpha is a measure that compares a fund's return with the return of a dynamic strategy that attempts to match the fund's risk exposures.

To estimate the 4-index alpha, the following time-series regression model is used:

$$R_{it} - R_{ft} = \alpha_i + \beta_{i1}\mathrm{RMRF}_t + \beta_{i2}\mathrm{SMB}_t + B_{i3}\mathrm{HML}_t + \beta_{i4}\mathrm{UMD}_t + \varepsilon_{it} \quad (1)$$

where $R_{it} - R_{ft}$ = the excess total return (net of the 30-day T-bill return) for fund i during the month t; α_i = the alpha for fund i; RMRF_t is the value weighted market return on all NYSE/AMEX/NASDAQ firms in excess of the risk-free rate; SMB_t is the difference in returns across small and big stock portfolios controlling for the same weighted average book-to-market equity in the two portfolios; HML_t is the difference in returns between high and low book-to-market equity portfolios; UMD_t is the momentum factor, the average return on two high prior return portfolios minus the average return on two low prior portfolios, computed by Fama and French.[16]

To estimate the conditional alpha, we use the following regression model:

$$R_{it} - R_{ft} = \alpha_i + \beta_{i1}\mathrm{RMRF}_t + \beta_{i2}(\mathrm{RMRF}_t{*}\mathrm{TB}_{t-1}) + B_{i3}(\mathrm{RMRF}_t{*}\mathrm{TS}_{t-1}) + \varepsilon_{it} \quad (2)$$

where TB_{t-1} is the lagged 1-month T-Bill rate and TS_{t-1} is the lagged Treasury Slope Measure (10-year Treasury yield minus the 3-month Treasury Bill yield).

For all three measures of performance (excess mean return, 4-index alpha, and the conditional alpha), we perform the estimation using both excess returns and excess gross returns. The excess returns are directly from Morningstar (minus the risk-free rate) and are adjusted for expenses but not adjusted for loads. To calculate gross returns we follow two specific steps. First, to adjust for expenses, we use a method similar to Chen et al. (2004). Specifically, we calculate the average annual expense ratio for each fund over the out-of-sample period (2000–2003). We then divide the average annual expense ratio by 12 and add this to the monthly returns from 2000 to 2003.

[14] It is difficult to know what funds actually use to evaluate their own performance. Evans (2005) argues that funds use risk-adjusted performance measures for manager promotion decisions. Moreover, we know from Elton et al. (2003) that many funds use benchmarks to evaluate their own performance. If this is the case, it seems appropriate to use the 4-index or conditional alphas as these are measures based on widely known benchmarks.

[15] See Fama and French (1993), Jegadeesh and Titman (1993), Carhart (1997).

[16] The data for the 4-index alpha were obtained from Kenneth French's webpage.

Second, to adjust for the fact that managers may extract rents indirectly via the brokerage costs paid by the fund in its own trading, we use a method from Bogle (1994) in which we add back a monthly trading cost proxy to the returns. The trading cost proxy is twice the average annual turnover of the fund over the period 2000–2003, multiplied by 0.6 percent and divided by 12 to arrive at a monthly figure. This monthly trading cost is then added back to the returns. We use gross returns as it may well be the case that better managers, who may be from better schools, get their rents via higher expense ratios or via brokerage arrangements such as directed brokerage or soft dollars.[17]

Finally, note that we also performed our analysis using load-adjusted returns. We did this since the return data from Morningstar did not adjust for loads, which may be an important factor in overall performance. To adjust for the loads we used a procedure similar to Sirri and Tufano (1998) and Rea and Reid (1998) that adjusts each monthly return for the front or deferred load. We do not report the results of the load-adjusted returns as they were broadly similar to those using excess and gross returns. These load-adjusted results are available upon request.

4. Results

4.1. Summary statistics

Table 1 presents summary statistics for the data we use in the study. The table reports that the mean composite SAT score of undergraduate institutions of the managers (including SATs estimated through conversion from the ACT) is approximately 1247. For the sample for which SAT scores are available, the average verbal SAT score is 621 and the average math SAT scores of 634.[18] Approximately 16 percent of the managers received their undergraduate degrees from liberal arts institutions. In terms of MBA degrees, approximately 57 percent of the funds have managers who hold MBA degrees and the mean GMAT score of these MBA programs is approximately 660.

To more fully examine the effect of MBA quality on performance, we create three dummy categorical variables, GMAT1, GMAT2 and GMAT3, to rank-order the quality of the MBA programs by their GMAT scores. Specifically, GMAT1, GMAT2, and GMAT3 are dummy variables that are equal to unity if the manager completed an MBA from a graduate school with mean GMAT scores greater than or equal to 700, between 699 and 600, and 599 or less, respectively.[19] Table 1 reports that approximately 24 percent of funds in our entire sample are

[17] We thank a referee for noting this point.

[18] Note that while Tables 3 and 4 use the mean composite SAT score of the undergraduate institution of the manager, we estimated an alternative specification in which we specified the mean verbal and math scores as separate regressors to examine if managers that went to better quantitative schools (higher math SAT averages) performed differently from other managers. The results of this analysis did not produce any significantly different results and are not reported here.

[19] In addition to GMAT1–3, we also ran two alternative specifications that produced similar results. First, we examined GMAT1–3 where we divided the MBA managers into thirds based on the MBA school mean GMAT scores. To do this we rank ordered all the managers with MBAs by the mean GMAT of the MBA school. The top third of the managers were classified as GMAT1, the middle third as GMAT2 and the bottom third as GMAT3. We used the mean SAT scores of the manager to break any ties in terms of the rank ordering. Second, we examined five GMAT dummy variables (GMAT1–5), where GMAT1 is a dummy for managers with MBAs from schools with mean GMAT scores of 700 or more; GMAT2 is a dummy for managers with MBAs from schools with mean GMAT scores between 699 and 650; GMAT3 is a dummy for managers with MBAs from schools with mean GMAT scores between 649 and 600; GMAT4 is a dummy for managers with MBAs from schools with mean GMAT scores between 599 and 550; and GMAT5 is a dummy for managers with MBAs from schools with mean GMAT scores between 549 and below.

Table 1
Descriptive statistics

Name	Number	Mean	STD
SAT/100	518	12.466	1.487
SAT Verbal (non-missing only)	496	6.208	0.726
SAT Math (non-missing only)	496	6.342	0.744
LIBERAL ARTS	518	0.160	0.367
MBA	518	0.573	0.495
GMAT/100 (non-missing only)	297	6.596	0.602
GMAT1 (700 and above)	518	0.236	0.425
GMAT2 (600–699)	518	0.247	0.432
GMAT3 (599–below)	518	0.089	0.285
BusinessWeek1 (1–10)	518	0.247	0.432
BusinessWeek2 (11–30)	518	0.106	0.308
BusinessWeek3 (second tier)	518	0.046	0.210
BusinessWeek4 (third tier)	518	0.037	0.188
BusinessWeek5 (unranked)	518	0.135	0.342
CFA	518	0.502	0.500
OTHERGRAD	518	0.322	0.468
Ph.D.	518	0.019	0.138
AGE/10 (non-missing only)	359	4.736	0.914
MISSINGAGE	518	0.307	0.462
TENURE	518	5.888	4.665
AGGROWTH	518	0.056	0.230
EQINCOME	518	0.071	0.258
GRINCOME	518	0.199	0.400
SMALLCOM	518	0.178	0.383
GROWTH	518	0.496	0.500
EXPENSE	518	1.28	0.367
TURNOVER/10	518	8.853	9.872
LOG(ASSETS)	518	19.091	1.875
LOAD	518	2.278	2.616
BETA	518	0.97	0.323

SAT is the mean composite SAT score of the manager's undergraduate school, or the value of the ACT converted into the SAT score. SAT Verbal and SAT Math are the verbal and math components of the composite SAT score. LIBERAL ARTS is a dummy variable that is equal to unity if the manager attended a liberal arts school. MBA is a dummy variable that is equal to unity if the manager completed an MBA degree. GMAT is the mean GMAT score of the manager's MBA graduate school (non-missing GMAT scores only). GMAT1, GMAT2, and GMAT3 are dummy variables that are equal to unity if the manager completed an MBA from a graduate school with mean GMAT scores greater than or equal to 700, between 699 and 600, and below 600, respectively. BusinessWeek1 through BusinessWeek5 are dummy variables that are equal to unity if the manager completed an MBA from a graduate school that is ranked by Business Week, respectively, among the top 10, 11–30, second tier, third tier, or unranked. CFA is a dummy variable that is equal to unity if the manager is a Chartered Financial Analyst (CFA). OTHERGRAD is a dummy variable that is equal to unity if the manager completed a non-MBA masters-level graduate degree. Ph.D. is a dummy variable that is equal to unity if the manager completed a Ph.D. AGE is the manager's age, valued at zero if the data is missing. MISSINGAGE is a dummy variable that is equal to unity if the manager's age data is missing. TENURE is tenure of the manager at the fund. AGGROWTH, EQINCOME, GRINCOME, SMALLCOM, and GROWTH are dummies for aggressive growth, equity-income, growth-income, small company, and growth styles of funds, respectively. EXPENSE and TURNOVER/10 are the average percentage expense ratios and turnover ratios (divided by 10) for the period 2000–2003. ASSETS are the average net assets of the fund for the period 2000–2003. LOAD is the front or deferred percentage load of the fund as of December 31, 1999. BETA is the single-index market model Beta for the period 2000–2003.

run by managers holding MBAs from programs with mean GMAT scores of 700 or more.[20] Approximately 25 percent of the funds are directed by managers holding MBAs from GMAT2 schools, and approximately 9 percent of the funds are run by managers holding MBAs from GMAT3 schools.

As a complement to the GMAT1–3 specification we also created dummy variables to rank order the quality of the MBA program by *Business Week* rankings. *Business Week* magazine produces rankings of the top 70 full-time MBA programs (see www.Businessweek.com, for the 2004 MBA rankings). Specifically, *Business Week* rank-orders the top 30 business schools, classifies 20 additional schools as second tier, and classifies another additional 20 schools as third tier. With these rankings we created five dummy variables, denoted BusinessWeek1–5, where BusinessWeek1 is a dummy for managers with MBA from the top 10 business schools; BusinessWeek2 is a dummy for managers from the schools ranked 11–30; BusinessWeek3 is a dummy for schools ranked as second tier schools; BusinessWeek4 is a dummy for schools ranked as third tier schools; and BusinessWeek5 is a dummy for schools that were unranked by Business Week.[21] Table 1 indicates that 25 percent of managers (roughly the same percentage as GMAT 1) hold MBA degrees from schools ranked in the top 10 by Business Week. Approximately 11 percent of the funds are run by managers holding MBAs from BusinessWeek2 schools, 5 percent from BusinessWeek3 schools, 4 percent from BusinessWeek4 schools, and 14 percent from unranked schools (BusinessWeek5).

In terms of other education besides that of undergraduate and MBA degrees, Table 1 reports that approximately 50 percent of the funds have managers with CFA designations, while approximately 32 percent of the funds have managers with graduate degrees other than an MBA. Slightly less than 2 percent of the managers hold Ph.D. degrees.

Table 2 presents the correlations between the variables. The results indicate a correlation coefficient of 0.49 between the SAT and GMAT scores of fund managers who have both undergraduate and MBA degrees. This indicates that fund managers who graduated from high-prestige undergraduate institutions do not necessarily attend high-prestige MBA programs. This result is important as the relatively low degree of correlation implies less potential for multi-collinearity and validates our approach to specifically examine the effect of MBA programs.[22]

Table 2 also shows some interesting results regarding CFA designations. First, the results show that the CFA degree is more a supplement rather than a substitute for an MBA as the correlation between CFA and MBA is 0.18. Indeed, in further analysis (not reported in Table 2) we find that 66 percent of the CFA holders also hold MBA degrees. Second, the results show that while there is a relatively high correlation between a manager holding an MBA and a CFA designation, there is little or no correlation between educational prestige and the CFA designation. More specifically, the correlation between the mean SAT score of the undergraduate institution and CFA is -0.01, while the correlation between the mean GMAT score of the MBA school and the CFA designation is 0.02. Hence, managers from lower prestige schools are just as likely to hold CFA designations as are managers from higher prestige schools.

[20] The business schools from which fund managers in our sample graduated in the GMAT1 group included Wharton, Columbia, Harvard, Stanford, NYU, MIT, Northwestern, UCLA, Duke and UC-Berkeley.

[21] As with the GMAT1–3 variable, we tried alternative specifications and found similar results. For instance, we examined BusinessWeek1–7 where the seven dummies were based on the top 5 schools, schools ranked 6–10, schools ranked 11–20, schools ranked 21–30, second tier schools, third tier schools and unranked schools.

[22] Note that as a robustness check, for all estimations in which we use SAT and GMAT as regressors (Table 5), we re-estimated using only the GMAT variable and excluding the SAT variable to ensure that our results are not function of multicollinearity. The results were very similar to those reported in Table 5.

Table 2
Correlation coefficients

Name		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
SAT/100	[1]																													
SAT Verbal	[2]	0.99																												
SAT Math	[3]	0.99	0.97																											
LIBERAL ARTS	[4]	0.15	0.17	0.09																										
MBA	[5]	0.03	0.03	0.01	0.08																									
GMAT/100	[6]	0.49	0.48	0.48	0.16	n.a.																								
GMAT1	[7]	0.28	0.28	0.27	0.14	0.48	0.65																							
GMAT2	[8]	−0.10	−0.12	−0.12	−0.03	0.49	−0.05	−0.32																						
GMAT3	[9]	−0.22	−0.19	−0.20	−0.04	0.27	−0.82	−0.17	−0.18																					
BusinessWeek1	[10]	0.33	0.33	0.32	0.05	0.49	0.65	0.68	0.01	−0.18																				
BusinessWeek2	[11]	−0.02	−0.04	−0.04	0.14	0.30	0.20	0.21	0.21	−0.11	−0.20																			
BusinessWeek3	[12]	−0.10	−0.11	−0.10	−0.05	0.19	−0.04	−0.12	0.38	−0.07	−0.13	−0.08																		
BusinessWeek4	[13]	−0.03	−0.03	−0.05	0.05	0.17	−0.10	−0.11	0.32	−0.02	−0.11	−0.07	−0.04																	
BusinessWeek5	[14]	−0.28	−0.27	−0.27	−0.10	0.34	−0.85	−0.22	0.10	0.77	−0.23	−0.14	−0.09	−0.08																
CFA	[15]	−0.01	−0.02	−0.04	0.04	0.18	0.02	0.03	0.19	−0.01	0.05	0.03	0.07	0.11	0.07															
OTHERGRAD	[16]	0.01	0.04	0.02	−0.06	−0.66	0.04	−0.31	−0.32	−0.20	−0.33	−0.20	−0.13	−0.07	−0.25	−0.06														
Ph.D.	[17]	0.06	0.06	0.05	−0.02	−0.11	0.04	−0.04	−0.08	−0.04	−0.05	−0.05	−0.03	−0.03	−0.06	0.00	0.17													
AGE/10	[18]	0.00	0.00	−0.02	0.10	−0.09	0.04	0.01	−0.06	−0.09	−0.01	−0.07	−0.08	0.03	−0.03	−0.06	0.07	0.04												
MISSINGAGE	[19]	−0.05	−0.07	−0.07	0.07	−0.02	−0.03	−0.06	0.05	0.00	−0.08	0.07	0.03	−0.09	0.04	−0.02	−0.04	0.03	n.a.											
TENURE	[20]	0.05	0.05	0.05	0.00	0.02	−0.01	0.07	−0.06	0.03	0.06	−0.03	−0.08	0.05	0.00	−0.03	0.04	−0.05	0.45	−0.24										
AGGROWTH	[21]	−0.02	−0.04	−0.04	−0.01	−0.03	0.00	0.00	−0.02	−0.02	−0.04	0.03	−0.01	0.04	−0.02	0.02	0.08	−0.03	−0.05	0.04	−0.05									
EQINCOME	[22]	−0.05	−0.03	−0.04	0.06	0.03	0.02	0.04	−0.02	0.02	−0.02	0.07	0.01	−0.05	0.02	0.02	0.05	0.07	−0.04	0.01	0.00	−0.07								
GRINCOME	[23]	0.00	−0.02	−0.01	0.01	0.04	0.01	0.02	−0.01	0.03	0.04	−0.01	0.07	−0.07	0.00	0.01	−0.03	0.07	0.08	0.03	0.03	−0.12	−0.14							
SMALLCOM	[24]	−0.02	−0.02	−0.02	−0.04	0.04	0.02	0.09	−0.03	0.00	0.06	−0.05	0.02	0.04	−0.01	0.03	0.00	−0.03	−0.08	−0.02	0.00	−0.11	−0.13	−0.23						
GROWTH	[25]	0.06	0.06	0.05	0.00	−0.07	−0.03	−0.10	0.05	−0.02	−0.05	0.00	−0.07	0.03	0.00	−0.05	−0.04	−0.06	0.05	−0.02	0.00	−0.24	−0.28	−0.49	−0.46					
EXPENSE	[26]	−0.13	−0.11	−0.13	0.01	−0.05	−0.25	−0.11	−0.04	0.14	−0.13	−0.04	0.04	0.04	0.09	−0.09	0.07	−0.07	0.11	0.04	−0.03	0.03	−0.10	−0.21	0.23	0.03				
TURNOVER/10	[27]	−0.03	−0.04	−0.03	0.02	−0.05	−0.13	−0.03	−0.08	0.08	−0.04	−0.05	−0.03	−0.02	0.06	0.00	0.04	−0.01	−0.01	0.11	−0.18	0.15	−0.13	−0.11	0.02	0.07	0.18			
LOG(ASSETS)	[28]	0.20	0.18	0.19	0.07	0.05	0.25	0.19	−0.06	−0.10	0.19	0.00	−0.09	0.00	−0.11	0.06	−0.01	0.05	−0.11	−0.05	0.11	0.07	0.04	0.03	−0.10	0.00	−0.42	−0.09		
LOAD	[29]	0.00	0.00	0.00	0.04	0.06	0.02	0.01	0.05	0.01	−0.05	0.13	0.10	0.01	−0.03	−0.02	−0.03	−0.02	−0.08	0.01	−0.12	0.03	0.05	0.02	−0.10	0.02	0.02	−0.07	−0.06	
BETA	[30]	−0.03	−0.05	−0.04	0.00	−0.07	−0.04	−0.04	−0.02	−0.01	0.00	−0.03	−0.05	−0.05	−0.01	−0.01	0.06	−0.06	−0.11	0.05	−0.19	0.24	−0.28	−0.20	0.04	0.16	0.24	0.23	−0.06	−0.02

Sample period is January 2000–December 2003. $n=518$ for all coefficients except coefficients associated with SAT Verbal ($n=496$), SAT Math ($n=496$), GMAT/100 ($n=297$), and AGE/10 ($n=359$). SAT/100 is the SAT score divided by 100. Age/10 is the age divided by 10.

4.2. The relationship between fund characteristics and manager characteristics

Table 3 presents the results of the regressions of fund characteristics on manager characteristics. The dependent variables include the beta of the fund estimated with a single index model over the out-of-sample period; the natural logarithm of the out-of-sample net assets; out-of-sample turnover ratio/10 and the out-of-sample expense ratio of each fund. The estimation is repeated for three distinct model specifications.

Panel A presents the results where actual GMAT score (GMAT/100) is used as an independent variable. For those managers that did not complete an MBA the GMAT variable is valued at zero; we therefore add the NO MBA dummy, which is equal to unity if the manager does not hold an MBA and zero otherwise, to control for these cases. Other independent variables are the SAT score divided by 100; the dummy variables LIBERAL ARTS, CFA, OTHERGRAD (holding a graduate degree other than an MBA), and Ph.D.; age of the manager divided by 10; a dummy variable for managers with no age data;[23] manager tenure at the fund; and dummy variables for the prospectus objectives with growth funds as the reference group. Panels B and C present the results when using the GMAT1–3 and BusinessWeek1–5 dummy variables.

The results in Table 3 suggest several interesting findings related to manager characteristics and fund attributes that can be contrasted with Golec (1996) and Chevalier and Ellison (1999a). To better organize the description of these results and to integrate our results with the previous literature, we divide this section into four subsections: beta, turnover, expense ratio, and fund size.

4.2.1. Beta

The previous literature has found some evidence of a relationship between education and beta. Both Golec and Chevalier and Ellison find that funds with MBA managers have significantly higher betas. In addition, Chevalier and Ellison also find that managers from higher mean SAT undergraduate institutions have significantly higher betas. Conversely, in our results we find little relationship between beta and education of the manager. Specifically, we find no significant relationship between beta and the quality of education (mean SAT, mean GMAT or Business Week rankings), or between beta and the quantity of education (no MBA, CFA, Ph.D. and other graduate degree). One possible explanation for the difference in our results as compared to the literature is that our analysis is conducted during a relatively bearish market (2000–2003) while Golec (1988–1990) and Chevalier and Ellison (1988–1994) conduct their analyses when the markets were more bullish. It is reasonable to conjecture that well-educated managers might take on less risky positions in a bear market.

In terms of other manager characteristics that influence beta, both Golec and Chevalier and Ellison find that age is positively related to beta. Chevalier and Ellison (1999b) attempt to explain this behavior by concluding that younger managers hold less risk in an effort "to minimize the probability of job loss". In our results, we do not find that the relationship between age and beta is significant. Again, the differing sample periods may explain why our findings differ from those in the literature. In a bear market period, older managers may be taking less risk and hence the age effect is not as strong.

Besides manager education and age, the only other manager characteristic found to be related to beta in the literature is manager tenure. Both Chevalier and Ellison and Golec find that manager tenure is negatively related to the beta of the fund, although Golec's results are not

[23] Specifically, any manager with no age information is given a zero for the age variable. The missing age dummy then gives a value of unity for a manager with zero age.

significant at standard levels. We find a very significant negative relationship between manager tenure and beta. Hence, the longer the manager has worked for the fund, the lower the beta.

4.2.2. Turnover

Our results show that a number of manager characteristics influence turnover. Specifically, we find that both the tenure of the manager and the lack of an MBA significantly reduce fund turnover. We also find in panel A of Table 3 that, even after controlling for the size of the fund, the manager's GMAT score is significantly related to turnover. Funds with managers from higher GMAT MBA programs tend to have lower turnover than funds with managers from low-GMAT programs. Our results also indicate that the mean SAT of the manager's undergraduate institution does not play a significant role in explaining fund turnover.[24] This result differs from Chevalier and Ellison who find that the mean SAT of the undergraduate institution of the manager is negatively related to turnover.

4.2.3. Expenses

In the previous literature, Chevalier and Ellison find that the relationship between the mean SAT of the undergraduate institution attended by the manager and the expense ratio of the fund is negative and significant. They also find (along with Golec) that the age of the fund manager is positively related to expenses and that fund size is negatively related to expenses.

Our results show similar findings. We find that the size of the fund is negatively related to expenses and that the age of the manager is positively related to expenses. Most interestingly, similar to the results for turnover, we find that the GMAT score is negatively related to expenses. Hence, funds with managers who hold MBAs from lower GMAT programs tend to have higher expenses.

4.2.4. Fund size

Chevalier and Ellison examine how fund manager characteristics are related to fund size, as measured by net assets under management. They find that manager tenure and fund size are positively and significantly related while manager age and fund size are negatively and significantly related. Hence, large funds tend to employ younger managers and employ these managers for longer periods of time. They also document that larger funds tend to hire managers who hold MBA degrees and undergraduate degrees from higher mean SAT undergraduate institutions.

Our results for manager tenure and age are similar to those reported by Chevalier and Ellison. We also find that managers from higher mean SAT institutions tend to work at larger funds. However, we find exactly the opposite regarding MBAs. Specifically, we find that larger funds tend to hire non-MBA managers. Finally, we also find that the better the GMAT score of the MBA manager, the bigger the fund. Hence, if a large fund hires an MBA manager, it will more likely hire one from a top program.

In summary, Table 3 provides three interesting results. First, unlike Chevalier and Ellison and Golec, we find that most manager characteristics with the exception of tenure are not significantly related to beta. The difference between our results and the others may be because we test a relatively bearish market sample period whereas the past literature is based on a relatively bullish market sample. Second, we find that managers who hold MBAs from low-GMAT schools (or lowly ranked by Business Week), have significantly higher expense and

[24] When we drop the GMAT scores from the regression in Table 3, panel A, we still find that the mean SAT variable is not significantly related to fund turnover.

turnover ratios than other managers. These results continue to hold after controlling for fund size. Third, larger funds tend to hire managers who do not hold MBAs or hold MBAs from high mean GMAT MBA schools.

4.3. Fund performance and manager characteristics

The results of our tests of fund performance on manager and fund characteristics are presented in Tables 4–7. In each of these four tables we estimate fund performance over the

Table 3
Regressions of fund characteristics on manager characteristics

Independent variables	Dependent variable			
	BETA	TURNOVER/10	EXPENSE	LOG(ASSETS)
Panel A: regressions using GMAT scores as an independent variable				
Intercept	1.148***	18.112**	3.072***	14.819***
SAT/100	−0.008	0.050	−0.006	0.164***
LIBERAL ARTS	0.033	0.789	0.054	0.178
GMAT/100	−0.011	−1.990**	−0.105***	0.575***
NO MBA	−0.068	−12.646*	−0.719***	3.730***
CFA	−0.004	0.221	−0.048*	0.194
OTHERGRAD	0.043	0.474	0.071*	−0.068
Ph.D.	−0.089	−0.290	−0.085	0.833
AGE/10	−0.006	0.918	0.040*	−0.436***
MISSINGAGE	−0.020	5.840*	0.197*	−2.102***
TENURE	−0.012***	−0.385***	−0.003	0.072***
AGGROWTH	0.237***	4.758**	0.078	0.630*
EQINCOME	−0.381***	−5.046***	−0.147**	0.219
GRINCOME	−0.178***	−2.759**	−0.158***	0.110
SMALLCOM	−0.026	0.112	0.139***	−0.453**
LOG(LAG ASSETS)	0.007	0.039	−0.062***	
No. of observations	518	518	518	518
Adjusted R^2	0.188	0.067	0.247	0.092
Panel B: regressions using GMAT1–3 dummy variables as independent variables				
Intercept	1.096***	7.356	2.385***	18.599***
SAT/100	−0.010	−0.078	−0.009	0.165***
LIBERAL ARTS	0.031	0.557	0.050	0.166
GMAT1	0.006	−0.112	−0.002	0.503*
GMAT2	−0.012	−1.781	0.009	−0.161
GMAT3	0.018	3.063*	0.186***	−0.512
CFA	−0.003	0.462	−0.044	0.228
OTHERGRAD	0.047	0.625	0.075*	−0.060
Ph.D.	−0.090	−0.377	−0.082	0.814
AGE/10	−0.006	0.979	0.043**	−0.447***
MISSINGAGE	−0.018	6.212**	0.213**	−2.134***
TENURE	−0.012***	−0.398***	−0.003	0.070***
AGGROWTH	0.235***	4.631**	0.079	0.579
EQINCOME	−0.385***	−5.377***	−0.154***	0.195
GRINCOME	−0.180***	−2.955***	−0.163***	0.102
SMALLCOM	−0.029	−0.118	0.138***	−0.506**
LOG(LAG ASSETS)	0.007	0.006	−0.063***	
No. of observations	518	518	518	518
Adjusted R^2	0.187	0.074	0.248	0.095

Table 3 (*continued*)

Independent variables	Dependent variable			
	BETA	TURNOVER/10	EXPENSE	LOG(ASSETS)
Panel C: regressions using BusinessWeek1–5 dummy variables as independent variables				
Intercept	1.157***	8.137	2.419***	18.692***
SAT/100	−0.013	−0.080	−0.010	0.152***
LIBERAL ARTS	0.037	0.895	0.053	0.204
BusinessWeek1	0.032	−0.377	−0.005	0.478*
BusinessWeek2	−0.014	−1.691	0.000	−0.087
BusinessWeek3	−0.043	−1.543	0.091	−0.613
BusinessWeek4	−0.124*	−1.544	0.062	0.017
BusinessWeek5	0.009	1.458	0.095*	−0.378
CFA	0.000	0.201	−0.054*	0.228
OTHERGRAD	0.050	0.591	0.072*	−0.066
Ph.D.	−0.087	−0.280	−0.079	0.813
AGE/10	−0.006	0.838	0.037*	−0.436***
MISSINGAGE	−0.024	5.450*	0.185*	−2.064***
TENURE	−0.012***	−0.380***	−0.002	0.068***
AGGROWTH	0.241***	4.870**	0.079	0.637*
EQINCOME	−0.388***	−5.169***	−0.152***	0.274
GRINCOME	−0.183***	−2.795**	−0.160***	0.123
SMALLCOM	−0.029	0.019	0.136***	−0.465**
LOG(LAG ASSETS)	0.006	−0.003	−0.063***	
No. of observations	518	518	518	518
Adjusted R^2	0.192	0.062	0.235	0.092

The dependent variables are the Beta of the fund for the period 2000–2003, the out-of-sample turnover, out-of-sample expense ratio and log of the out-of-sample net assets for each fund. GMAT/100 is the mean GMAT score of the MBA program attended by the manager divided by 100. GMAT1, GMAT2, and GMAT3 are dummy variables that are equal to unity if the manager completed an MBA from a graduate school with mean GMAT scores greater than or equal to 700, between 699 and 600, and below 600, respectively. BusinessWeek1 through BusinessWeek5 are dummy variables that are equal to unity if the manager completed an MBA from a graduate school that is ranked by Business Week, respectively, among the top 10, 11–30, second tier, third tier, or unranked. NO MBA is a dummy equal to 1 if the GMAT score is missing. LAG ASSETS is the net assets of the fund for December 31, 1999. ***, **, * Indicate significance at the 1, 5, and 10 percent levels, respectively.

period 2000–2003 using excess and gross returns. We use three performance measures: simple (mean monthly) returns, the 4-index alpha, and the Ferson–Schadt conditional alpha. For each of the six performance measures (two types of returns and three performance metrics), we run two types of regressions. First, using ordinary least squares (OLS) we estimate a regression that includes fund manager education variables, age, missing age, tenure, and fund style as independent variables. Second, we estimate an instrumental variable (IV) regression that includes out-of-sample expense ratio, net assets, and turnover as independent variables. Since fund expenses and turnover can simultaneously affect fund performance, we treat these two variables as endogenous. We then use the lagged expense ratio and turnover ratios (data as of December 31, 1999 from the January 2000 Morningstar disk) as instruments in the regression. These two estimation procedures are very similar to Chevalier and Ellison and are somewhat similar to Golec (1996).

In order to test if our results are robust over different time periods, in Tables 4–7, we report the results for four different sub-samples: 2000, 2000–2001, 2000–2002, and 2000–2003. Since expenses are treated as exogenous in the IV regressions, we get very similar results when using

Table 4
Performance regressions using MBA dummy only

Independent variables	Dependent variable is the performance measure								
	Performance measure/estimation method/type of returns								
	Simple/OLS/ Excess return	4-index/OLS/ Excess return	Cond./OLS/ Excess return	Simple/OLS/ Gross return	4-index/OLS/ Gross return	Cond./OLS/ Gross return	Simple/IV/ Excess return	4-index/IV/ Excess return	Cond./IV/ Excess return
Panel A: sample period January 2000–December 2000									
Intercept	−0.933*	1.074**	1.249**	−0.751	1.257**	1.431***	−0.427	−0.605	0.745
SAT/100	0.045	−0.001	0.010	0.044	−0.002	0.009	0.047	−0.014	0.011
LIBERAL ARTS	−0.070	−0.363***	−0.049	−0.052	−0.346**	−0.032	−0.081	−0.396***	−0.092
MBA	−0.017	0.002	−0.067	−0.027	−0.009	−0.078	0.022	−0.002	−0.044
CFA	0.098	0.072	0.064	0.097	0.070	0.063	0.101	0.065	0.073
OTHERGRAD	−0.001	0.160	0.042	0.003	0.165	0.046	0.024	0.137	0.028
Ph.D.	−0.106	−0.368	−0.142	−0.122	−0.384	−0.159	−0.107	−0.392	−0.107
AGE/10	−0.070	−0.080	−0.114*	−0.056	−0.066	−0.100	−0.084	−0.069	−0.141**
MISSINGAGE	−0.172	−0.102	−0.359	−0.075	−0.004	−0.261	−0.269	−0.074	−0.544*
TENURE	0.015	−0.032***	−0.016	0.010	−0.036***	−0.020*	0.021*	−0.031***	−0.006
AGGROWTH	−0.217	0.170	0.546***	−0.187	0.201	0.577***	−0.247	0.085	0.474**
EQINCOME	0.714***	0.060	0.032	0.649***	−0.005	−0.033	0.755***	0.148	0.165
GRINCOME	0.116	−0.091	−0.233*	0.063	−0.144	−0.286**	0.145	−0.023	−0.126
SMALLCOM	1.070***	0.471***	1.190***	1.085***	0.487***	1.205***	1.074***	0.466***	1.148***
EXPENSE							−0.122	0.252*	0.209
LOG(ASSETS)							0.013***	0.010**	0.020***
TURNOVER/10							−0.026	0.073***	0.005
No. of observations	518	518	518	518	518	518	518	518	518
Adjusted R^2	0.123	0.072	0.183	0.119	0.081	0.186	0.135	0.090	0.224

Panel B: sample period January 2000–December 2001

Intercept	−1.242**	0.964***	0.682*	−1.048**	1.159***	0.877**	−0.641	0.811	0.405
SAT/100	0.035	−0.034*	0.005	0.032	−0.037*	0.003	0.039	−0.032	0.011
LIBERAL ARTS	0.009	−0.177**	0.001	0.028	−0.158*	0.020	0.016	−0.176**	−0.017
MBA	0.082	0.008	0.043	0.077	0.003	0.038	0.091	−0.002	0.038
CFA	0.045	−0.016	0.008	0.045	−0.016	0.008	0.051	−0.010	0.021
OTHERGRAD	−0.002	0.070	0.063	0.010	0.082	0.075	0.007	0.061	0.039
Ph.D.	−0.205	−0.158	−0.262	−0.230	−0.183	−0.287	−0.203	−0.146	−0.219
AGE/10	−0.064	−0.093**	−0.107**	−0.051	−0.081*	−0.094*	−0.067	−0.095**	−0.123**
MISSINGAGE	−0.155	−0.266	−0.333	−0.071	−0.183	−0.249	−0.160	−0.269	−0.415
TENURE	0.022**	−0.005	0.001	0.018*	−0.010	−0.004	0.023**	−0.007	0.003
AGGROWTH	−0.404**	−0.105	0.163	−0.369*	−0.070	0.198	−0.388*	−0.088	0.153
EQINCOME	0.569***	0.016	−0.132	0.502***	−0.050	−0.199	0.551***	0.004	−0.090
GRINCOME	0.261**	0.059	−0.094	0.213*	0.011	−0.142	0.240**	0.058	−0.055
SMALLCOM	1.262***	0.594***	1.294***	1.278***	0.610***	1.310***	1.262***	0.575***	1.246***
EXPENSE							−0.100	0.104	0.215*
LOG(ASSETS)							−0.001	−0.005	0.003
TURNOVER/10							−0.027	0.004	−0.001
No. of observations	518	518	518	518	518	518	518	518	518
Adjusted R^2	0.193	0.125	0.294	0.191	0.139	0.301	0.191	0.128	0.294

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Table 4 (*continued*)

Independent variables	Dependent variable is the performance measure								
	Performance measure/estimation method/type of returns								
	Simple/OLS/ Excess return	4-index/OLS/ Excess return	Cond./OLS/ Excess return	Simple/OLS/ Gross return	4-index/OLS/ Gross return	Cond./OLS/ Gross return	Simple/IV/ Excess return	4-index/IV/ Excess return	Cond./IV/ Excess return
Panel C: sample period January 2000–December 2002									
Intercept	−1.611***	0.425	0.336	−1.409***	0.628**	0.538	−1.043	0.142	0.056
SAT/100	0.022	−0.012	0.008	0.018	−0.015	0.004	0.020	−0.012	0.012
LIBERAL ARTS	−0.012	−0.070	0.048	0.002	−0.055	0.063	0.001	−0.067	0.038
MBA	0.106	0.058	0.086	0.104	0.055	0.084	0.112	0.048	0.082
CFA	0.022	−0.014	0.014	0.022	−0.014	0.013	0.025	−0.006	0.027
OTHERGRAD	0.005	0.087	0.073	0.017	0.099	0.086	0.020	0.082	0.059
Ph.D.	−0.041	−0.133	−0.159	−0.061	−0.153	−0.179	−0.055	−0.132	−0.137
AGE/10	−0.043	−0.071**	−0.071	−0.029	−0.057*	−0.057	−0.034	−0.065*	−0.078*
MISSINGAGE	−0.137	−0.309*	−0.249	−0.051	−0.223	−0.163	−0.074	−0.263	−0.276
TENURE	0.022**	−0.002	0.002	0.018**	−0.006	−0.002	0.019**	−0.006	0.002
AGGROWTH	−0.391**	−0.134	0.056	−0.349**	−0.091	0.098	−0.354**	−0.103	0.056
EQINCOME	0.621***	0.000	−0.066	0.554***	−0.067	−0.134	0.561***	−0.037	−0.054
GRINCOME	0.281***	0.089	−0.078	0.234**	0.043	−0.124	0.232**	0.075	−0.060
SMALLCOM	1.041***	0.328***	1.026***	1.056***	0.342***	1.041***	1.053***	0.313***	0.992***
EXPENSE							−0.142	0.110	0.174
LOG(ASSETS)							−0.007*	−0.009***	−0.002
TURNOVER/10							−0.018	0.012	0.003
No. of observations	518	518	518	518	518	518	518	518	518
Adjusted R^2	0.197	0.052	0.263	0.194	0.062	0.275	0.209	0.069	0.258

Panel D: sample period January 2000–December 2003									
Intercept	−0.708**	0.166	0.235	−0.499	0.375*	0.444*	−0.899*	−0.073	−0.227
SAT/100	0.017	−0.009	0.002	0.012	−0.014	−0.003	0.014	−0.012	0.005
LIBERAL ARTS	0.014	−0.074	0.029	0.024	−0.065	0.039	0.014	−0.073	0.019
MBA	0.116	0.062	0.085	0.114	0.060	0.083	0.111	0.054	0.078
CFA	0.021	−0.021	0.002	0.017	−0.025	−0.002	0.022	−0.017	0.013
OTHERGRAD	0.045	0.085	0.079	0.056	0.096*	0.09	0.046	0.085	0.066
Ph.D.	−0.086	−0.096	−0.084	−0.099	−0.109	−0.097	−0.091	−0.098	−0.065
AGE/10	−0.022	−0.042	−0.050	−0.008	−0.028	−0.035	−0.014	−0.031	−0.057
MISSINGAGE	−0.024	−0.171	−0.138	0.059	−0.088	−0.055	0.024	−0.105	−0.171
TENURE	0.014*	0.000	0.001	0.010	−0.004	−0.003	0.011	−0.005	0.001
AGGROWTH	−0.183	−0.145	0.190*	−0.133	−0.095	0.240**	−0.159	−0.102	0.185*
EQINCOME	0.336***	0.065	−0.109	0.271**	0.001	−0.174*	0.304**	0.014	−0.090
GRINCOME	0.164**	0.136***	−0.113*	0.123	0.095*	−0.155**	0.150*	0.115**	−0.087
SMALLCOM	0.958***	0.228***	0.998***	0.972***	0.243***	1.012***	0.956***	0.222***	0.968***
EXPENSE							0.036	0.071	0.197**
LOG(ASSETS)							−0.007*	−0.011***	−0.002
TURNOVER/10							0.011	0.014	0.011
No. of observations	518	518	518	518	518	518	518	518	518
Adjusted R^2	0.219	0.043	0.353	0.223	0.047	0.367	0.227	0.086	0.344

The dependent variable is the performance measure. The sample period begins January 2000, and ends December 2000, 2001, 2002, and 2003 for Panels A through D, respectively. Estimation is performed using OLS or Instrumental Variable (IV) estimation. When the estimation is IV, the expense and turnover ratios are treated as endogenous variables and the lagged expense and turnover ratios are used as instruments. Columns 1–3 present the results for performance measures calculated using excess returns and estimated using OLS. Columns 4–6 present the results for performance measures calculated using gross returns and estimated using OLS. Columns 7–9 present the results for performance measures calculated using excess returns and estimated using IV. Columns 1, 4, and 7 present the results using simple excess mean monthly returns. Columns 2, 5 and 8 present the results using the 4-index alpha. Columns 3, 6 and 9 present the results using the conditional alpha. ***, **, * Indicate significance at the 1, 5, and 10 percent levels, respectively.

Table 5
Performance regressions using GMAT scores

Independent variables	Dependent variable is the performance measure								
	Performance measure/estimation method/type of returns								
	Simple/OLS/ Excess return	4-index/OLS/ Excess return	Cond./OLS/ Excess return	Simple/OLS/ Gross return	4-index/OLS/ Gross return	Cond./OLS/ Gross return	Simple/IV/ Excess return	4-index/IV/ Excess return	Cond./IV/ Excess return
Panel A: sample period January 2000–December 2000									
Intercept	−1.620**	0.607	1.174	−1.307	0.920	1.486*	−1.210	−1.119	0.399
SAT/100	0.030	−0.011	0.009	0.032	−0.009	0.011	0.030	−0.025	0.005
LIBERAL ARTS	−0.081	−0.371***	−0.049	−0.061	−0.352**	−0.030	−0.097	−0.406***	−0.098
GMAT/100	0.132	0.092	0.002	0.104	0.065	−0.026	0.164	0.104	0.061
NO MBA	0.886	0.606	0.077	0.714	0.434	−0.094	1.055	0.687	0.447
CFA	0.096	0.070	0.064	0.095	0.069	0.063	0.099	0.064	0.073
OTHERGRAD	−0.001	0.160	0.042	0.003	0.165	0.046	0.023	0.136	0.028
Ph.D.	−0.101	−0.364	−0.142	−0.118	−0.382	−0.160	−0.096	−0.384	−0.103
AGE/10	−0.073	−0.082	−0.114*	−0.059	−0.068	−0.099	−0.090	−0.073	−0.143**
MISSINGAGE	−0.184	−0.110	−0.359	−0.084	−0.010	−0.259	−0.296	−0.091	−0.554*
TENURE	0.015	−0.031***	−0.016	0.010	−0.036***	−0.021*	0.022*	−0.031**	−0.006
AGGROWTH	−0.222	0.167	0.546***	−0.190	0.199	0.578***	−0.251	0.082	0.472**
EQINCOME	0.703***	0.052	0.032	0.641***	−0.010	−0.030	0.746***	0.142	0.161
GRINCOME	0.112	−0.094	−0.233*	0.060	−0.146	−0.285**	0.144	−0.023	−0.127
SMALLCOM	1.064***	0.467***	1.190***	1.080***	0.484***	1.206***	1.062***	0.458***	1.144***
EXPENSE							−0.110	0.260*	0.214
LOG(ASSETS)							0.013***	0.010**	0.021***
TURNOVER/10							−0.029	0.072***	0.004
No. of observations	518	518	518	518	518	518	518	518	518
Adjusted R^2	0.124	0.071	0.181	0.119	0.080	0.185	0.137	0.090	0.223

Panel B: sample period January 2000–December 2001

Intercept	−2.368***	0.574	0.047	−2.044***	0.899*	0.372	−1.742*	0.414	−0.366
SAT/100	0.008	−0.043*	−0.010	0.009	−0.042*	−0.009	0.013	−0.041*	−0.006
LIBERAL ARTS	−0.012	−0.184**	−0.011	0.010	−0.163*	0.010	−0.007	−0.183**	−0.033
GMAT/100	0.238**	0.078	0.134	0.212**	0.052	0.107	0.244**	0.081	0.166**
NO MBA	1.484**	0.508	0.836	1.315*	0.338	0.666	1.517**	0.534	1.054*
CFA	0.041	−0.018	0.005	0.042	−0.017	0.006	0.048	−0.011	0.019
OTHERGRAD	−0.002	0.070	0.063	0.010	0.082	0.075	0.005	0.060	0.038
Ph.D.	−0.196	−0.155	−0.257	−0.222	−0.181	−0.283	−0.186	−0.140	−0.208
AGE/10	−0.070	−0.095**	−0.110**	−0.056	−0.082*	−0.097*	−0.076	−0.098**	−0.129**
MISSINGAGE	−0.176	−0.273	−0.345	−0.090	−0.187	−0.259	−0.202	−0.282	−0.443*
TENURE	0.023**	−0.005	0.001	0.019*	−0.010	−0.004	0.025**	−0.006	0.004
AGGROWTH	−0.412**	−0.108	0.159	−0.376*	−0.072	0.195	−0.395**	−0.091	0.148
EQINCOME	0.549***	0.010	−0.143	0.485***	−0.054	−0.208	0.539***	0.000	−0.098
GRINCOME	0.254**	0.056	−0.098	0.207*	0.009	−0.145	0.239**	0.057	−0.056
SMALLCOM	1.250***	0.590***	1.288***	1.268***	0.608***	1.305***	1.244***	0.569***	1.234***
EXPENSE							−0.080	0.111	0.229*
LOG(ASSETS)							0.000	−0.004	0.004
TURNOVER/10							−0.031	0.002	−0.005
No. of observations	518	518	518	518	518	518	518	518	518
Adjusted R^2	0.200	0.125	0.296	0.196	0.138	0.302	0.198	0.128	0.298

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Table 5 (*continued*)

Independent variables	Dependent variable is the performance measure								
	Performance measure/estimation method/type of returns								
	Simple/OLS/ Excess return	4-index/OLS/ Excess return	Cond./OLS/ Excess return	Simple/OLS/ Gross return	4-index/OLS/ Gross return	Cond./OLS/ Gross return	Simple/IV/ Excess return	4-index/IV/ Excess return	Cond./IV/ Excess return
Panel C: sample period January 2000–December 2002									
Intercept	−2.413***	−0.206	−0.373	−2.069***	0.138	−0.029	−1.714**	−0.427	−0.714
SAT/100	0.001	−0.027	−0.010	0.001	−0.027	−0.010	0.003	−0.025	−0.006
LIBERAL ARTS	−0.028	−0.082	0.035	−0.011	−0.065	0.052	−0.014	−0.079	0.022
GMAT/100	0.179**	0.136**	0.157**	0.151*	0.107*	0.128*	0.163*	0.129**	0.178**
NO MBA	1.071*	0.835**	0.945**	0.887	0.651*	0.760	0.962	0.798**	1.086**
CFA	0.019	−0.016	0.011	0.019	−0.016	0.011	0.024	−0.007	0.025
OTHERGRAD	0.005	0.087	0.073	0.018	0.100	0.086	0.019	0.081	0.057
Ph.D.	−0.034	−0.128	−0.153	−0.055	−0.149	−0.175	−0.044	−0.123	−0.125
AGE/10	−0.047	−0.074**	−0.075*	−0.033	−0.060*	−0.060	−0.041	−0.070**	−0.085*
MISSINGAGE	−0.153	−0.321*	−0.263	−0.065	−0.233	−0.174	−0.103	−0.285*	−0.307
TENURE	0.023**	−0.001	0.003	0.018**	−0.006	−0.002	0.021**	−0.005	0.003
AGGROWTH	−0.397**	−0.138	0.051	−0.353**	−0.095	0.094	−0.359**	−0.107	0.050
EQINCOME	0.607***	−0.011	−0.079	0.541***	−0.076	−0.144	0.553***	−0.044	−0.063
GRINCOME	0.275***	0.085	−0.082	0.230**	0.040	−0.128	0.231**	0.074	−0.061
SMALLCOM	1.033***	0.321***	1.019***	1.049***	0.337***	1.035***	1.041***	0.304***	0.979***
EXPENSE							−0.129	0.120	0.188*
LOG(ASSETS)							−0.007*	−0.009***	−0.001
TURNOVER/10							−0.022	0.009	−0.001
No. of observations	518	518	518	518	518	518	518	518	518
Adjusted R^2	0.202	0.061	0.269	0.197	0.067	0.278	0.212	0.076	0.264

Panel D: sample period January 2000–December 2003

Intercept	−1.425***	−0.402	−0.155	−1.062**	−0.039	0.207	−1.519**	−0.527	−0.688
SAT/100	−0.002	−0.023	−0.009	−0.003	−0.024*	−0.010	−0.002	−0.023	−0.006
LIBERAL ARTS	−0.001	−0.085	0.021	0.012	−0.073	0.033	0.000	−0.083	0.009
GMAT/100	0.164**	0.124***	0.094*	0.134*	0.094**	0.063	0.154**	0.107**	0.113*
NO MBA	0.964**	0.755**	0.531	0.764	0.556*	0.332	0.901*	0.649**	0.668*
CFA	0.018	−0.023	0.000	0.015	−0.026	−0.003	0.021	−0.018	0.012
OTHERGRAD	0.045	0.085	0.079	0.056	0.096*	0.090	0.045	0.085	0.065
Ph.D.	−0.080	−0.091	−0.080	−0.094	−0.106	−0.095	−0.080	−0.091	−0.057
AGE/10	−0.025	−0.045	−0.052	−0.011	−0.030	−0.037	−0.020	−0.036	−0.061*
MISSINGAGE	−0.039	−0.182	−0.146	0.047	−0.096	−0.060	−0.004	−0.124	−0.192
TENURE	0.015**	0.000	0.001	0.010	−0.004	−0.003	0.012	−0.004	0.002
AGGROWTH	−0.188	−0.149*	0.187*	−0.137	−0.098	0.238**	−0.165	−0.106	0.181*
EQINCOME	0.323***	0.055	−0.116	0.260**	−0.007	−0.179*	0.296**	0.009	−0.096
GRINCOME	0.160**	0.133**	−0.116*	0.119	0.092*	−0.157**	0.149*	0.115**	−0.087
SMALLCOM	0.950***	0.222***	0.993***	0.966***	0.238***	1.009***	0.945***	0.214***	0.960***
EXPENSE							0.048	0.079	0.206**
LOG(ASSETS)							−0.006*	−0.011***	−0.001
TURNOVER/10							0.007	0.011	0.008
No. of observations	518	518	518	518	518	518	518	518	518
Adjusted R^2	0.226	0.055	0.355	0.227	0.054	0.368	0.232	0.093	0.347

The dependent variable is the performance measure. Estimation is performed using OLS or Instrumental Variable (IV) estimation. When the estimation is IV, the expense and turnover ratios are treated as endogenous variables and the lagged expense and turnover ratios are used as instruments. Columns 1–3 present the results for performance measures calculated using excess returns and estimated using OLS. Columns 4–6 present the results for performance measures calculated using gross returns and estimated using OLS. Columns 7–9 present the results for performance measures calculated using excess returns and estimated using IV. Columns 1, 4, and 7 present the results using simple excess mean monthly returns. Columns 2, 5 and 8 present the results using the 4-index alpha. Columns 3, 6 and 9 present the results using the conditional alpha. ***, **, * Indicate significance at the 1, 5, and 10 percent levels, respectively.

Table 6
Performance regressions using GMAT1–3 dummy variables

Panel A: sample period January 2000–December 2000									
Independent variables	Dependent variable is the performance measure								
	Performance measure/estimation method/type of returns								
	Simple/OLS/ Excess return	4-index/OLS/ Excess return	Cond./OLS/ Excess return	Simple/OLS/ Gross return	4-index/OLS/ Gross return	Cond./OLS/ Gross return	Simple/IV/ Excess return	4-index/IV/ Excess return	Cond./IV/ Excess return
Intercept	−0.694	1.388**	1.327**	−0.541	1.542***	1.480***	−0.156	−0.244	0.897
SAT/100	0.030	−0.022	0.004	0.031	−0.022	0.005	0.032	−0.034	0.003
LIBERAL ARTS	−0.079	−0.384***	−0.058	−0.062	−0.367***	−0.041	−0.092	−0.415***	−0.100
GMAT1	0.040	0.146	−0.020	0.029	0.136	−0.030	0.078	0.122	0.000
GMAT2	−0.021	−0.061	−0.116	−0.046	−0.086	−0.141	0.032	−0.036	−0.058
GMAT3	−0.261	−0.209	−0.083	−0.224	−0.171	−0.046	−0.277	−0.257	−0.167
CFA	0.095	0.078	0.072	0.096	0.080	0.074	0.095	0.068	0.075
OTHERGRAD	−0.015	0.160	0.040	−0.009	0.166	0.046	0.005	0.132	0.021
Ph.D.	−0.104	−0.367	−0.152	−0.123	−0.387	−0.171	−0.093	−0.382	−0.107
AGE/10	−0.079	−0.089	−0.115*	−0.064	−0.073	−0.099	−0.098	−0.082	−0.147**
MISSINGAGE	−0.213	−0.134	−0.359	−0.107	−0.028	−0.253	−0.335	−0.132	−0.571*
TENURE	0.016	−0.031***	−0.016	0.010	−0.037***	−0.021*	0.023*	−0.030**	−0.006
AGGROWTH	−0.225	0.148	0.538**	−0.195	0.178	0.568***	−0.254	0.069	0.468**
EQINCOME	0.710***	0.038	0.023	0.644***	−0.028	−0.043	0.759***	0.137	0.162
GRINCOME	0.117	−0.099	−0.238*	0.063	−0.153	−0.292**	0.154	−0.022	−0.125
SMALLCOM	1.061***	0.446***	1.180***	1.075***	0.461***	1.195***	1.060***	0.440***	1.138***
EXPENSE							−0.100	0.267*	0.218
LOG(ASSETS)							0.014***	0.010**	0.021***
TURNOVER/10							−0.028	0.069**	0.003
No. of observations	518	518	518	518	518	518	518	518	518
Adjusted R^2	0.124	0.075	0.181	0.118	0.083	0.184	0.137	0.094	0.222
Test	Wald Test results for January 2000–December 2000								
	Simple/OLS/ Excess return	4-index/OLS/ Excess return	Cond./OLS/ Excess return	Simple/OLS/ Gross return	4-index/OLS/ Gross return	Cond./OLS/ Gross return	Simple/IV/ Excess return	4-index/IV/ Excess return	Cond./IV/ Excess return
GMAT1=GMAT2	0.179	2.030	0.463	0.260	2.232	0.571	0.100	1.189	0.178
GMAT1=GMAT3	2.274	3.127*	0.105	1.549	2.259	0.006	3.167*	3.574*	0.764
GMAT2=GMAT3	1.571	0.585	0.032	0.832	0.190	0.243	2.610	1.314	0.351

Panel B: sample period January 2000–December 2001

Independent variables	Dependent variable is the performance measure								
	Performance measure/estimation method/type of returns								
	Simple/OLS/ Excess return	4-index/OLS/ Excess return	Cond./OLS/ Excess return	Simple/OLS/ Gross return	4-index/OLS/ Gross return	Cond./OLS/ Gross return	Simple/IV/ Excess return	4-index/IV/ Excess return	Cond./IV/ Excess return
Intercept	−0.956*	1.101***	0.850**	−0.788	1.268***	1.018**	−0.374	0.937*	0.590
SAT/100	0.018	−0.042*	−0.005	0.017	−0.043**	−0.006	0.023	−0.041*	−0.001
LIBERAL ARTS	0.006	−0.178**	−0.001	0.025	−0.160*	0.018	0.009	−0.180**	−0.022
GMAT1	0.114	0.023	0.065	0.110	0.019	0.061	0.129	0.019	0.067
GMAT2	0.157	0.064	0.094	0.138	0.044	0.075	0.163	0.050	0.100
GMAT3	−0.307*	−0.193	−0.188	−0.266	−0.151	−0.146	−0.305	−0.207	−0.246
CFA	0.026	−0.029	−0.004	0.030	−0.025	−0.001	0.034	−0.021	0.008
OTHERGRAD	−0.018	0.066	0.056	−0.005	0.079	0.069	−0.014	0.055	0.028
Ph.D.	−0.185	−0.150	−0.250	−0.212	−0.177	−0.278	−0.173	−0.134	−0.200
AGE/10	−0.078	−0.101**	−0.115**	−0.064	−0.086**	−0.101*	−0.085	−0.105**	−0.136***
MISSINGAGE	−0.223	−0.301	−0.373	−0.131	−0.210	−0.282	−0.249	−0.315	−0.479*
TENURE	0.025**	−0.004	0.002	0.020*	−0.009	−0.003	0.026**	−0.005	0.005
AGGROWTH	−0.406**	−0.105	0.162	−0.371*	−0.071	0.196	−0.393**	−0.091	0.149
EQINCOME	0.574***	0.020	−0.130	0.506***	−0.048	−0.198	0.566***	0.013	−0.079
GRINCOME	0.270**	0.064	−0.089	0.221*	0.014	−0.138	0.258**	0.067	−0.042
SMALLCOM	1.260***	0.594***	1.293***	1.276***	0.610***	1.309***	1.251***	0.570***	1.239***
EXPENSE							−0.064	0.123	0.242*
LOG(ASSETS)							0.000	−0.004	0.004
TURNOVER/10							−0.028	0.003	−0.002
No. of observations	518	518	518	518	518	518	518	518	518
Adjusted R^2	0.201	0.130	0.297	0.197	0.140	0.302	0.199	0.132	0.299
Test	Wald Test results for January 2000–December 2001								
	Simple/OLS/ Excess return	4-index/ OLS/Excess return	Cond./OLS/ Excess return	Simple/OLS/ Gross return	4-index/OLS/ Gross return	Cond./OLS/ Gross return	Simple/IV/ Excess return	4-index/IV/ Excess return	Cond./IV/ Excess return
GMAT1 = GMAT2	0.106	0.198	0.075	0.043	0.074	0.015	0.066	0.113	0.092
GMAT1 = GMAT3	5.358**	3.030*	3.033*	4.242**	1.883	1.973	5.516**	3.218*	4.551**
GMAT2 = GMAT3	7.094***	4.641**	4.103**	5.323**	2.684	2.434	6.987***	4.513**	6.015**

(continued on next page)

Table 6 (*continued*)

Panel C: sample period January 2000–December 2002									
Independent variables	Dependent variable is the performance measure								
	Performance measure/estimation method/type of returns								
	Simple/OLS/ Excess return	4-index/OLS/ Excess return	Cond./OLS/ Excess return	Simple/OLS/ Gross return	4-index/OLS/ Gross return	Cond./OLS/ Gross return	Simple/IV/ Excess return	4-index/IV/ Excess return	Cond./IV/ Excess return
Intercept	−1.392***	0.638**	0.539	−1.218***	0.812***	0.712**	−0.84	0.373	0.299
SAT/100	0.008	−0.025	−0.005	0.006	−0.027	−0.007	0.009	−0.025	−0.001
LIBERAL ARTS	−0.015	−0.075	0.044	−0.001	−0.061	0.058	−0.004	−0.075	0.031
GMAT1	0.137	0.115	0.135	0.135	0.112	0.132	0.146	0.111	0.138
GMAT2	0.154	0.101	0.121	0.137	0.084	0.104	0.149	0.083	0.120
GMAT3	−0.178	−0.190*	−0.150	−0.133	−0.145	−0.105	−0.145	−0.188*	−0.187
CFA	0.009	−0.025	0.004	0.012	−0.022	0.007	0.016	−0.014	0.018
OTHERGRAD	−0.007	0.086	0.068	0.007	0.100	0.083	0.007	0.080	0.051
Ph.D.	−0.022	−0.119	−0.144	−0.044	−0.142	−0.166	−0.031	−0.115	−0.115
AGE/10	−0.053	−0.081**	−0.080*	−0.038	−0.065*	−0.064	−0.046	−0.076**	−0.091**
MISSINGAGE	−0.187	−0.352**	−0.290	−0.093	−0.257	−0.195	−0.133	−0.318*	−0.338
TENURE	0.024***	−0.001	0.003	0.019**	−0.006	−0.002	0.021**	−0.004	0.004
AGGROWTH	−0.394**	−0.140	0.050	−0.351**	−0.098	0.093	−0.359**	−0.112	0.048
EQINCOME	0.623***	−0.003	−0.068	0.554***	−0.072	−0.138	0.569***	−0.035	−0.049
GRINCOME	0.287***	0.092	−0.074	0.239**	0.045	−0.122	0.243**	0.082	−0.050
SMALLCOM	1.039***	0.321***	1.020***	1.053***	0.335***	1.034***	1.045***	0.300***	0.980***
EXPENSE							−0.119	0.129	0.196*
LOG(ASSETS)							−0.006*	−0.009***	−0.001
TURNOVER/10							−0.020	0.009	0.000
No. of observations	518	518	518	518	518	518	518	518	518
Adjusted R^2	0.202	0.069	0.269	0.196	0.072	0.277	0.211	0.082	0.264
Test	Wald Test results for January 2000–December 2002								
	Simple/OLS/ Excess return	4-index/OLS/ Excess return	Cond./OLS/ Excess return	Simple/OLS/ Gross return	4-index/OLS/ Gross return	Cond./OLS/ Gross return	Simple/IV/ Excess return	4-index/IV/ Excess return	Cond./IV/ Excess return
GMAT1 = GMAT2	0.022	0.036	0.024	0.000	0.159	0.102	0.001	0.151	0.040
GMAT1 = GMAT3	4.176**	9.476***	5.429**	3.060*	6.901***	3.707*	3.455*	8.876***	6.758***
GMAT2 = GMAT3	5.048**	9.421***	5.354**	3.386*	5.951**	3.125*	3.855**	7.947***	6.573**

Panel D: sample period January 2000–December 2003

Independent variables	Dependent variable is the performance measure								
	Performance measure/estimation method/type of returns								
	Simple/OLS/ Excess return	4-index/OLS/ Excess return	Cond./OLS/ Excess return	Simple/OLS/ Gross return	4-index/OLS/ Gross return	Cond./OLS/ Gross return	Simple/IV/ Excess return	4-index/IV/ Excess return	Cond./IV/ Excess return
Intercept	−0.521	0.338	0.339	−0.344	0.516**	0.516*	−0.724	0.095	−0.095
SAT/100	0.005	−0.020	−0.005	0.003	−0.023*	−0.007	0.005	−0.021	−0.002
LIBERAL ARTS	0.012	−0.078	0.028	0.021	−0.068	0.037	0.011	−0.078	0.016
GMAT1	0.146	0.103	0.105	0.143	0.100	0.102	0.142	0.098	0.105
GMAT2	0.158*	0.106*	0.108	0.141	0.090	0.091	0.147	0.088	0.104
GMAT3	−0.123	−0.150*	−0.045	−0.075	−0.102	0.003	−0.112	−0.130	−0.080
CFA	0.010	−0.032	−0.004	0.009	−0.032	−0.005	0.014	−0.024	0.007
OTHERGRAD	0.036	0.083	0.076	0.049	0.096*	0.089	0.036	0.084	0.061
Ph.D.	−0.067	−0.082	−0.071	−0.083	−0.098	−0.087	−0.069	−0.083	−0.049
AGE/10	−0.030	−0.050*	−0.054	−0.015	−0.034	−0.038	−0.024	−0.041	−0.064*
MISSINGAGE	−0.066	−0.208	−0.160	0.026	−0.116	−0.068	−0.029	−0.149	−0.209
TENURE	0.015**	0.001	0.002	0.010	−0.004	−0.003	0.012*	−0.004	0.002
AGGROWTH	−0.185	−0.148*	0.188*	−0.136	−0.099	0.238**	−0.165	−0.109	0.181*
EQINCOME	0.337***	0.064	−0.109	0.271**	−0.002	−0.175*	0.311**	0.018	−0.086
GRINCOME	0.170**	0.140***	−0.110*	0.126	0.097*	−0.154**	0.160*	0.122**	−0.080
SMALLCOM	0.955***	0.225***	0.996***	0.969***	0.238***	1.010***	0.949***	0.214***	0.962***
EXPENSE							0.056	0.086	0.211**
LOG(ASSETS)							−0.006*	−0.011***	−0.001
TURNOVER/10							0.010	0.012	0.010
No. of observations	518	518	518	518	518	518	518	518	518
Adjusted R^2	0.225	0.062	0.354	0.226	0.058	0.366	0.230	0.097	0.345
Test	Wald Test results for January 2000–December 2003								
	Simple/OLS/ Excess return	4-index/OLS/ Excess return	Cond./OLS/ Excess return	Simple/OLS/ Gross return	4-index/OLS/ Gross return	Cond./OLS/ Gross return	Simple/IV/ Excess return	4-index/IV/ Excess return	Cond./IV/ Excess return
GMAT1 = GMAT2	0.016	0.003	0.002	0.000	0.032	0.020	0.003	0.032	0.000
GMAT1 = GMAT3	4.705**	9.906***	2.309	3.150*	6.648***	0.982	4.017**	7.992***	3.351*
GMAT2 = GMAT3	5.571**	11.071***	2.620	3.371*	6.535**	0.857	4.573**	7.946***	3.614*

GMAT1, GMAT2, and GMAT3 are dummy variables that are equal to unity if the manager completed an MBA from a graduate school with mean GMAT scores greater than or equal to 700, between 699 and 600, and below 600, respectively. The dependent variable is the performance measure. Estimation is performed using OLS or Instrumental Variable (IV) estimation. When the estimation is IV, the expense and turnover ratios are treated as endogenous variables and the lagged expense and turnover ratios are used as instruments. Columns 1–3 present the results for performance measures calculated using excess returns and estimated using OLS. Columns 4–6 present the results for performance measures calculated using gross returns and estimated using OLS. Columns 7–9 present the results for performance measures calculated using excess returns and estimated using IV. Columns 1, 4, and 7 present the results using simple excess mean monthly returns. Columns 2, 5 and 8 present the results using the 4-index alpha. Columns 3, 6 and 9 present the results using the conditional alpha. The bottom portion of each panel provides the Wald Test results on tests of equality in the categorical dummy variables. ***, **, * Indicate significance from at the 1, 5, and 10 percent levels, respectively.

OLS or IV on our gross returns measures. Therefore, we only report results for gross returns associated with the OLS regressions. The IV results for gross returns are available upon request.

Table 4 presents the results of models very similar in spirit to those estimated by Chevalier and Ellison. In these tests we examine all funds in the sample and only use a dummy variable to distinguish MBA managers from non-MBA managers. The major differences between Chevalier and Ellison's tests and the tests presented in Table 4 are that we include manager tenure as an independent variable (due to its significance in several of the regressions in Table 3), we include additional educational variables such as CFA, OTHERGRAD, and Ph.D., and we examine three other prospectus objectives (aggressive growth, equity-income and small company) in addition to the two, growth and growth-income, used by Chevalier and Ellison.

The results presented in Table 4 show that there is little consistent evidence that the independent variables are significantly related to fund performance. All of the educational variables (including the mean SAT of the manager's undergraduate institution and whether the manager holds an MBA, CFA, etc.) indicate that educational background has little influence on performance. We do find that manager's age is generally negatively related to fund performance (although the significance level varies across the panels).[25] But other than this variable, little else, including expense ratios and turnover, is consistently significant.

Our results in Table 4 are somewhat similar to the findings of Chevalier and Ellison. They also find that the MBA degree is insignificant, and that manager age, and fund size are negatively related to fund performance. However, there are three major differences between the findings of Chevalier and Ellison and those presented here. First, Chevalier and Ellison find that expenses are negatively related to performance while we find that they are not significantly related to performance on a consistent basis.[26] Second, Chevalier and Ellison find that turnover is significantly and positively related to fund performance while we find no significant relationship between the two on a consistent basis.[27] Third and most importantly, Chevalier and Ellison find that the mean SAT variable is positively and significantly related to fund performance while we do not.[28]

What is the explanation for these differences between our study and Chevalier and Ellison? One explanation is that our data are very sensitive to issue of survivorship bias. As stated in the

[25] As shown in Table 2, manager age and tenure have a correlation of 45 percent. When we drop tenure from the regressions in Table 4, we find somewhat stronger evidence suggesting that manager age is negatively and significantly related to fund performance. However, the results are generally consistent with those reported in Table 4. The major difference between the results, which include tenure and those that do not, is in panel D of Table 4. When we drop tenure, we find manager age to be negatively and significantly related to fund performance. When we include tenure, we find that there is generally a negative relationship between manager age and performance, but it is not significant.

[26] Our finding that expenses are not significantly related to performance may not be as controversial as it might seem given recent literature which has found that expenses are negatively related to fund performance (Carhart, 1997). A new Lipper study, Clark (2004), finds that low expenses are good predictors of strong future performance for no-load and institutional funds. However, for load funds, higher expense levels tend to be better predictors of strong future performance. Moreover, other papers such as Grinblatt and Titman (1994) find that expenses are not related to fund performance.

[27] A finding that turnover is not related to performance is consistent with some of the previous literature. Both Ippolito (1989) and Droms and Walker (1994) find that turnover is not significantly related to fund performance. Conversely, Grinblatt and Titman (1994) along with Chevalier and Ellison, find that turnover is significantly and positively related to fund performance.

[28] In an earlier of version of this paper we used a somewhat smaller sample and a different methodology to account for manager changes and liquidations/mergers (instead of using the closest surviving fund we use the weighted average returns of the surviving fund of the same style) and found that the SAT variable was significant and positively related to fund performance at the ten percent level.

Table 7
Performance regressions using BusinessWeek1–5 dummy variables

Panel A: sample period January 2000–December 2000

Independent variables	Dependent variable is the performance measure								
	Performance measure/estimation method/type of returns								
	Simple/OLS/ Excess return	4-index/OLS/ Excess return	Cond./OLS/ Excess return	Simple/OLS/ Gross return	4-index/OLS/ Gross return	Cond./OLS/ Gross return	Simple/IV/ Excess return	4-index/IV/ Excess return	Cond./IV/ Excess return
Intercept	−0.751	1.297**	1.397**	−0.595	1.453**	1.553***	−0.178	−0.342	0.999
SAT/100	0.032	−0.018	−0.002	0.033	−0.017	−0.002	0.032	−0.028	−0.004
LIBERAL ARTS	−0.085	−0.366***	−0.041	−0.065	−0.345**	−0.020	−0.105	−0.402***	−0.093
BusinessWeek1	0.026	0.103	0.019	0.011	0.088	0.003	0.068	0.083	0.049
BusinessWeek2	0.030	−0.037	−0.100	0.009	−0.058	−0.121	0.104	−0.017	−0.037
BusinessWeek3	−0.187	−0.295	−0.273	−0.203	−0.312	−0.290	−0.147	−0.267	−0.248
BusinessWeek4	−0.064	−0.075	−0.346	−0.091	−0.103	−0.374	−0.010	−0.066	−0.292
BusinessWeek5	−0.132	−0.040	−0.058	−0.114	−0.022	−0.040	−0.139	−0.057	−0.101
CFA	0.107	0.082	0.079	0.106	0.080	0.077	0.112	0.076	0.090
OTHERGRAD	−0.014	0.161	0.047	−0.008	0.167	0.053	0.009	0.134	0.028
Ph.D.	−0.108	−0.371	−0.151	−0.126	−0.389	−0.169	−0.100	−0.389	−0.107
AGE/10	−0.071	−0.083	−0.114*	−0.057	−0.069	−0.100	−0.087	−0.074	−0.143**
MISSINGAGE	−0.173	−0.109	−0.363	−0.077	−0.013	−0.267	−0.277	−0.090	−0.555*
TENURE	0.014	−0.032***	−0.016	0.010	−0.037***	−0.021*	0.021*	−0.032***	−0.006
AGGROWTH	−0.221	0.172	0.555***	−0.189	0.204	0.587***	−0.253	0.088	0.481**
EQINCOME	0.712***	0.061	0.022	0.647***	−0.004	−0.043	0.754***	0.149	0.154
GRINCOME	0.118	−0.088	−0.240*	0.066	−0.140	−0.292**	0.150	−0.018	−0.132
SMALLCOM	1.069***	0.466***	1.188***	1.085***	0.483***	1.204***	1.069***	0.458***	1.141***
EXPENSE							−0.114	0.259*	0.216
LOG(ASSETS)							0.013***	0.009**	0.020***
TURNOVER/10							−0.029	0.069**	0.001
No. of observations	518	518	518	518	518	518	518	518	518
Adjusted R^2	0.119	0.069	0.181	0.114	0.079	0.185	0.132	0.087	0.223

Test	Wald Test results for January 2000–December 2000								
	Simple/OLS/ Excess return	4-index/OLS/ Excess return	Cond./OLS/ Excess return	Simple/OLS/ Gross return	4-index/OLS/ Gross return	Cond./OLS/ Gross return	Simple/IV/ Excess return	4-index/IV/ Excess return	Cond./IV/ Excess return
Bus1=Bus2	0.000	0.583	0.454	0.000	0.609	0.467	0.039	0.296	0.241
Bus1=Bus3	0.634	0.899	0.430	0.586	0.839	0.383	0.865	0.852	0.670

Panel A: sample period January 2000–December 2000

Test	Wald Test results for January 2000–December 2000								
	Simple/OLS/ Excess return	4-index/OLS/ Excess return	Cond./OLS/ Excess return	Simple/OLS/ Gross return	4-index/OLS/ Gross return	Cond./OLS/ Gross return	Simple/IV/ Excess return	4-index/IV/ Excess return	Cond./IV/ Excess return
Bus1=Bus4	0.105	0.415	1.860	0.131	0.458	1.866	0.082	0.295	1.708
Bus1=Bus5	0.798	0.648	0.199	0.480	0.370	0.060	1.388	0.626	0.783
Bus2=Bus3	0.634	0.899	0.430	0.586	0.839	0.383	0.865	0.852	0.670
Bus2=Bus4	0.099	0.017	0.729	0.109	0.022	0.722	0.150	0.028	0.825
Bus2=Bus5	0.637	0.000	0.047	0.355	0.029	0.160	1.453	0.040	0.109
Bus3=Bus4	0.129	0.409	0.048	0.103	0.356	0.060	0.163	0.346	0.019
Bus3=Bus5	0.044	0.951	0.725	0.112	1.181	0.915	0.001	0.650	0.355
Bus4=Bus5	0.056	0.015	1.052	0.006	0.074	1.323	0.204	0.001	0.487

(continued on next page)

Table 7 (*continued*)

Panel B: sample period January 2000–December 2001

Independent variables	Dependent variable is the performance measure								
	Performance measure/estimation method/type of returns								
	Simple/OLS/ Excess return	4-index/OLS/ Excess return	Cond./OLS/ Excess return	Simple/OLS/ Gross return	4-index/OLS/ Gross return	Cond./OLS/ Gross return	Simple/IV/ Excess return	4-index/IV/ Excess return	Cond./IV/ Excess return
Intercept	−0.950*	1.106***	0.950**	−0.777	1.279***	1.123***	−0.291	1.001*	0.782
SAT/100	0.013	−0.045**	−0.016	0.012	−0.046**	−0.017	0.017	−0.043*	−0.012
LIBERAL ARTS	−0.024	−0.188**	−0.014	−0.002	−0.166*	0.008	−0.021	−0.186**	−0.036
BusinessWeek1	0.147	0.059	0.145	0.138	0.050	0.136	0.160	0.055	0.152
BusinessWeek2	0.201	0.033	0.104	0.186	0.018	0.089	0.225	0.015	0.112
BusinessWeek3	−0.011	−0.109	−0.112	−0.017	−0.115	−0.118	−0.019	−0.133	−0.144
BusinessWeek4	0.152	0.031	−0.087	0.134	0.013	−0.105	0.156	0.017	−0.089
BusinessWeek5	−0.176	−0.071	−0.108	−0.158	−0.052	−0.090	−0.176	−0.077	−0.137
CFA	0.052	−0.013	0.019	0.052	−0.013	0.019	0.060	−0.006	0.035
OTHERGRAD	−0.017	0.069	0.063	−0.004	0.082	0.076	−0.009	0.059	0.037
Ph.D.	−0.193	−0.157	−0.255	−0.218	−0.183	−0.281	−0.184	−0.143	−0.206
AGE/10	−0.065	−0.095**	−0.107**	−0.052	−0.082*	−0.095*	−0.070	−0.098**	−0.126**
MISSINGAGE	−0.149	−0.266	−0.330	−0.067	−0.183	−0.248	−0.167	−0.277	−0.426*
TENURE	0.023**	−0.006	0.000	0.018*	−0.010	−0.004	0.023**	−0.007	0.003
AGGROWTH	−0.419**	−0.110	0.159	−0.382*	−0.073	0.195	−0.405**	−0.091	0.149
EQINCOME	0.566***	0.016	−0.143	0.499***	−0.050	−0.209	0.553***	0.007	−0.097
GRINCOME	0.262**	0.061	−0.099	0.214*	0.013	−0.147	0.245**	0.061	−0.057
SMALLCOM	1.255***	0.59***	1.288***	1.272***	0.607***	1.305***	1.252***	0.568***	1.235***
EXPENSE							−0.091	0.109	0.223*
LOG(ASSETS)							0.000	−0.004	0.003
TURNOVER/10							−0.030	0.001	−0.006
No. of observations	518	518	518	518	518	518	518	518	518
Adjusted R^2	0.195	0.122	0.296	0.192	0.134	0.302	0.194	0.124	0.298

Test	Wald Test results for January 2000–December 2001								
	Simple/OLS/ Excess return	4-index/OLS/ Excess return	Cond./OLS/ Excess return	Simple/OLS/ Gross return	4-index/OLS/ Gross return	Cond./OLS/ Gross return	Simple/IV/ Excess return	4-index/IV/ Excess return	Cond./IV/ Excess return
Bus1=Bus2	0.106	0.051	0.096	0.082	0.078	0.123	0.149	0.122	0.091
Bus1=Bus3	0.734	0.711	1.201	0.668	0.620	1.063	0.963	0.755	1.669
Bus1=Bus4	0.000	0.026	1.347	0.000	0.046	1.406	0.000	0.048	1.446
Bus1=Bus5	4.011**	1.376	3.893**	3.344*	0.852	2.993*	4.277**	1.404	5.005**
Bus2=Bus3	0.734	0.711	1.201	0.668	0.620	1.063	0.963	0.755	1.669
Bus2=Bus4	0.033	0.000	0.790	0.037	0.001	0.787	0.065	0.000	0.865
Bus2=Bus5	4.169**	0.676	2.089	3.442*	0.308	1.430	4.631**	0.517	2.828*
Bus3=Bus4	0.272	0.433	0.010	0.232	0.360	0.002	0.313	0.492	0.049
Bus3=Bus5	0.483	0.057	0.000	0.349	0.151	0.021	0.433	0.119	0.001
Bus4=Bus5	1.544	0.317	0.010	1.213	0.130	0.005	1.574	0.269	0.054

Panel C: sample period January 2000–December 2002

Independent variables	Dependent variable is the performance measure								
	Performance measure/estimation method/type of returns								
	Simple/OLS/ Excess return	4-index/OLS/ Excess return	Cond./OLS/ Excess return	Simple/OLS/ Gross return	4-index/OLS/ Gross return	Cond./OLS/ Gross return	Simple/IV/ Excess return	4-index/IV/ Excess return	Cond./IV/ Excess return
Intercept	−1.402***	0.659**	0.613*	−1.222***	0.840***	0.794**	−0.788	0.457	0.465
SAT/100	0.006	−0.030*	−0.015	0.004	−0.032*	−0.017	0.006	−0.029	−0.011
LIBERAL ARTS	−0.039	−0.087	0.032	−0.021	−0.069	0.050	−0.026	−0.082	0.020
BusinessWeek1	0.147	0.146*	0.193**	0.141	0.140*	0.186*	0.152	0.141*	0.198**
BusinessWeek2	0.209	0.108	0.164	0.194	0.093	0.149	0.222	0.090	0.174
BusinessWeek3	0.034	−0.077	−0.065	0.031	−0.080	−0.068	0.027	−0.100	−0.093
BusinessWeek4	0.171	0.069	−0.060	0.157	0.055	−0.074	0.165	0.046	−0.072
BusinessWeek5	−0.088	−0.082	−0.074	−0.067	−0.061	−0.053	−0.074	−0.081	−0.093
CFA	0.026	−0.008	0.026	0.026	−0.009	0.025	0.031	0.002	0.042
OTHERGRAD	−0.007	0.088	0.075	0.007	0.102	0.089	0.008	0.084	0.059
Ph.D.	−0.027	−0.125	−0.147	−0.048	−0.146	−0.168	−0.037	−0.121	−0.119
AGE/10	−0.043	−0.073**	−0.071*	−0.030	−0.059*	−0.057	−0.036	−0.069*	−0.081*
MISSINGAGE	−0.133	−0.307*	−0.245	−0.048	−0.222	−0.160	−0.080	−0.274	−0.287
TENURE	0.022**	−0.002	0.002	0.018**	−0.007	−0.003	0.020**	−0.006	0.002
AGGROWTH	−0.403**	−0.142	0.051	−0.359**	−0.098	0.095	−0.366**	−0.109	0.052
EQINCOME	0.619***	−0.003	−0.079	0.551***	−0.070	−0.147	0.562***	−0.037	−0.064
GRINCOME	0.283***	0.089	−0.083	0.237**	0.043	−0.129	0.237**	0.076	−0.064
SMALLCOM	1.038***	0.321***	1.020***	1.053***	0.336***	1.035***	1.048***	0.303***	0.981***
EXPENSE							−0.138	0.114	0.178
LOG(ASSETS)							−0.007*	−0.009***	−0.001
TURNOVER/10							−0.021	0.007	−0.004
No. of observations	518	518	518	518	518	518	518	518	518
Adjusted R^2	0.197	0.060	0.270	0.193	0.068	0.279	0.209	0.077	0.266

Test	Wald Test results for January 2000–December 2002								
	Simple/OLS/ Excess return	4-index/OLS/ Excess return	Cond./OLS/ Excess return	Simple/OLS/ Gross return	4-index/OLS/ Gross return	Cond./OLS/ Gross return	Simple/IV/ Excess return	4-index/IV/ Excess return	Cond./IV/ Excess return
Bus1=Bus2	0.196	0.179	0.067	0.147	0.278	0.112	0.248	0.313	0.045
Bus1=Bus3	0.699	1.885	1.913	0.618	1.692	1.694	0.867	1.988	2.555
Bus1=Bus4	0.013	0.322	2.261	0.006	0.399	2.366	0.004	0.484	2.559
Bus1=Bus5	2.945*	6.748***	6.106**	2.343	5.376**	4.858**	2.716*	6.336**	7.092***
Bus2=Bus3	0.699	1.885	1.913	0.618	1.692	1.694	0.867	1.988	2.555
Bus2=Bus4	0.028	0.072	1.536	0.027	0.069	1.499	0.063	0.090	1.835
Bus2=Bus5	3.598*	3.566*	3.709*	2.829*	2.407	2.637	3.561*	2.880*	4.560**
Bus3=Bus4	0.268	0.734	0.001	0.231	0.645	0.001	0.275	0.744	0.010
Bus3=Bus5	0.364	0.001	0.003	0.239	0.022	0.009	0.254	0.021	0.000
Bus4=Bus5	1.336	1.097	0.006	1.018	0.665	0.014	1.154	0.791	0.014

(continued on next page)

Table 7 (*continued*)

Panel D: sample period January 2000–December 2003

Independent variables	Dependent variable is the performance measure								
	Performance measure/estimation method/type of returns								
	Simple/OLS/ Excess return	4-index/OLS/ Excess return	Cond./OLS/ Excess return	Simple/OLS/ Gross return	4-index/OLS/ Gross return	Cond./OLS/ Gross return	Simple/IV/ Excess return	4-index/IV/ Excess return	Cond./IV/ Excess return
Intercept	−0.499	0.363	0.414	−0.314	0.548**	0.599**	−0.644	0.177	0.045
SAT/100	0.000	−0.025*	−0.013	−0.002	−0.027*	−0.016	−0.001	−0.026*	−0.010
LIBERAL ARTS	−0.006	−0.088	0.024	0.007	−0.075	0.037	−0.004	−0.084	0.013
BusinessWeek1	0.173*	0.135**	0.161**	0.167*	0.129**	0.155**	0.168*	0.128**	0.163**
BusinessWeek2	0.213*	0.101	0.129	0.196*	0.084	0.112	0.203*	0.082	0.126
BusinessWeek3	0.078	−0.002	0.018	0.073	−0.006	0.013	0.068	−0.022	−0.006
BusinessWeek4	0.071	0.081	−0.094	0.061	0.070	−0.104	0.060	0.060	−0.107
BusinessWeek5	−0.062	−0.069	−0.012	−0.038	−0.045	0.012	−0.055	−0.058	−0.030
CFA	0.028	−0.018	0.012	0.024	−0.022	0.008	0.030	−0.012	0.025
OTHERGRAD	0.039	0.085	0.083	0.052	0.098*	0.095	0.040	0.087	0.068
Ph.D.	−0.069	−0.087	−0.072	−0.084	−0.102	−0.087	−0.072	−0.087	−0.049
AGE/10	−0.021	−0.043	−0.049	−0.007	−0.029	−0.035	−0.015	−0.035	−0.058
MISSINGAGE	−0.018	−0.168	−0.134	0.064	−0.086	−0.052	0.018	−0.114	−0.178
TENURE	0.014*	0.000	0.001	0.010	−0.005	−0.003	0.011	−0.005	0.001
AGGROWTH	−0.191	−0.152*	0.190*	−0.140	−0.100	0.241**	−0.167	−0.107	0.186*
EQINCOME	0.327***	0.063	−0.122	0.263**	−0.002	−0.186*	0.299**	0.015	−0.101
GRINCOME	0.161**	0.135**	−0.121*	0.119	0.093*	−0.163**	0.149*	0.115**	−0.094
SMALLCOM	0.953***	0.221***	0.993***	0.968***	0.236***	1.008***	0.950***	0.213***	0.961***
EXPENSE							0.040	0.074	0.201**
LOG(ASSETS)							−0.006*	−0.011***	−0.001
TURNOVER/10							0.008	0.010	0.007
No. of observations	518	518	518	518	518	518	518	518	518
Adjusted R^2	0.222	0.053	0.356	0.224	0.053	0.369	0.229	0.093	0.349

Test	Wald Test results for January 2000–December 2003								
	Simple/OLS/ Excess return	4-index/OLS/ Excess return	Cond./OLS/ Excess return	Simple/OLS/ Gross return	4-index/OLS/ Gross return	Cond./OLS/ Gross return	Simple/IV/ Excess return	4-index/IV/ Excess return	Cond./IV/ Excess return
Bus1=Bus2	0.123	0.214	0.130	0.069	0.386	0.224	0.092	0.401	0.174
Bus1=Bus3	0.640	0.874	0.696	0.542	0.721	0.544	0.638	0.944	0.965
Bus1=Bus4	0.353	0.237	3.550*	0.394	0.294	3.617*	0.405	0.396	3.943**
Bus1=Bus5	4.590**	8.155***	3.982**	3.558*	6.256**	2.662	4.049**	6.924***	4.789**
Bus2=Bus3	0.640	0.874	0.696	0.542	0.721	0.544	0.638	0.944	0.965
Bus2=Bus4	0.590	0.028	2.341	0.554	0.015	2.183	0.608	0.038	2.533
Bus2=Bus5	4.783**	4.322**	2.013	3.547*	2.645	1.000	4.165**	3.043*	2.401
Bus3=Bus4	0.001	0.354	0.439	0.004	0.321	0.481	0.002	0.363	0.356
Bus3=Bus5	0.751	0.412	0.055	0.485	0.144	0.000	0.578	0.122	0.034
Bus4=Bus5	0.553	1.644	0.329	0.309	1.024	0.661	0.406	1.053	0.289

BusinessWeek1 through BusinessWeek5 are dummy variables that are equal to unity if the manager completed an MBA from a graduate school that is ranked by Business Week, respectively, among the top 10, 11–30, second tier, third tier, or unranked. The dependent variable is the performance measure. Estimation is performed using OLS or Instrumental Variable (IV) estimation. When the estimation is IV, the expense and turnover ratios are treated as endogenous variables and the lagged expense and turnover ratios are used as instruments. Columns 1–3 present the results for performance measures calculated using excess returns and estimated using OLS. Columns 4–6 present the results for performance measures calculated using gross returns and estimated using OLS. Columns 7–9 present the results for performance measures calculated using excess returns and estimated using IV. Columns 1, 4, and 7 present the results using simple excess mean monthly returns. Columns 2, 5 and 8 present the results using the 4-index alpha. Columns 3, 6 and 9 present the results using the conditional alpha. The bottom portion of each panel provides the Wald Test results on tests of equality in the categorical dummy variables. ***, **, * Indicate significance from zero at the 1, 5, and 10 percent levels, respectively.

introduction, neither Chevalier and Ellison nor Golec directly address the issue of survivorship bias in their data, while we carefully follow all the funds in the sample.

In Table 5, we replicate the regressions presented in Table 4 but we replace the MBA dummy with the mean GMAT score of the MBA program from which the manager graduated. For those managers that did not complete an MBA we give the GMAT variable a value of zero and add the NO MBA dummy to control for these cases. The results show several interesting findings. First, in the longer time horizons of panels C and D, we find that the mean GMAT score is positively and significantly related to fund performance. Hence, even after controlling for the quality of the undergraduate institution by using the SAT variable, we find evidence that the quality of the MBA program (as measured by the GMAT) plays a role in fund performance. Second, once we account for differences in MBA quality via the GMAT variable, the results indicate that managers without MBAs (NO MBA) perform significantly better than managers with MBAs. Third, similar to Table 4, we find that while manager age is often negatively related to fund performance, education variables such as CFA, OTHERGRAD, and Ph.D. are rarely significant.[29] Fourth, the variable LIBERAL ARTS is negative and sometimes significant.

In Tables 6 and 7, we present results in which we use the categorical variables, GMAT1–3 and BusinessWeek1–5, as independent variables. The reference group for these categorical variables is always funds with managers lacking MBA degrees. For the GMAT1–3 specification we find four results that are of interest. First, we find limited evidence that funds with managers from MBA programs with mean GMATs of 600 and above perform better than funds with managers without MBAs. In general, the point estimates of the tables (panels A–D) indicate higher performance for the GMAT1 and GMAT2 managers than the non-MBA manager group. Second, we find that funds with managers holding low prestige MBAs (GMAT3 and BusinessWeek5) have point estimates that, although insignificant, are generally negative, indicating that these managers may well be performing worse than managers without MBAs. Third, when we specifically compare the performance of managers from GMAT1 and GMAT2 schools to managers from GMAT3 schools, we find that the managers from the top programs perform significantly better than GMAT3 managers (this can be found in the Wald test results at the bottom of each panel of Table 6). Hence, for managers with MBAs, there seems to be a clear decrease in performance if they graduated from a school with a mean GMAT below 600. Fourth, and finally, we find there is no significant difference between the performance of managers with MBAs from GMAT1 schools and those from GMAT2 schools.[30]

Table 7 reports our estimation results using the BusinessWeek1–5 categorical variables. We find results that are generally similar to those reported in Table 6. That is, we find that the top two tiers of MBA managers (BusinessWeek1 and 2) often perform significantly better than managers without MBAs while managers from the lowest prestige schools perform worse than non-MBA managers in terms of point estimates. Furthermore, using Wald tests (the results are reported at the bottom of each panel of Table 7) we find clear evidence that that managers from the BusinessWeek1 and 2 groups perform significantly better than managers from Business-

[29] As mentioned in Footnote 23, we conducted all the results in which we use SAT and GMAT in the same regression (Table 5) using only the GMAT variable and excluding SAT so as to make sure our results are not function of multicollinearity. The results were very similar to those reported in Table 5.

[30] One possible explanation for our results is that the surviving sample of funds is disproportionately represented by high GMAT managers. However, we found that the percentage of surviving funds with managers from high GMAT schools remains relatively constant throughout the sample. Over the sample period, the percent of surviving funds with GMAT1 managers ranges from 22.6 percent to 24.7 percent, after starting at 23.6 percent in January 2000.

Week5 group. We also find, similar to Table 6, that there is little difference in performance between MBA managers from the top 10 schools and the next 20 ranked schools (BusinessWeek1 and 2, respectively).

Finally we note that there is no evidence in Tables 4–7 that managers with CFAs, other non-MBA masters-level graduate degrees, or Ph.D.s perform any better than other managers with less formal education. Indeed, the only type of manager education that does seem to influence performance is graduating from a top or near top MBA program. This result suggests that knowledge is acquired at these MBA programs that cannot be replicated in the CFA program, in lower prestige MBA programs, or even in high prestige undergraduate degree programs. In the following discussion we consider several possible explanations as to why this may be the case.

5. Discussion

The results presented above, with some minor exceptions, indicate that the only aspect of education that seems to influence mutual fund performance is attending a top or near top MBA program. The question we now try to answer is why this might be the case.

One obvious explanation for our results is that managers from top or near top MBA programs are simply more intelligent than other managers. In order to get into a top or near top program requires performing well on standardized tests, possibly implying higher intelligence. Alternatively, it may not be intelligence, but rather the social connections attained at high prestige MBA schools that allow for better performance. One can easily imagine a scenario where a mutual fund manager from a top MBA program gets allocations of IPOs from a business school friend working at an investment bank, while the low-level MBA manager who lacks such social connections does not. However, neither of these explanations is supported by our analysis. As mentioned above, the mean composite SAT scores of the undergraduate institution do not seem (at least in our reported analysis) to be related to better fund performance. One would expect that if intelligence and/or social connections really matter in mutual fund performance we would see a stronger result for the SAT variable.

Another possible explanation for our results is that better performance exhibited by managers from top and near top MBA programs is simply due to the qualities of the funds that hire such people. In other words, it may be that better managed funds tend to hire managers from top or near top programs. Indeed, in our results in Table 3, we do find some evidence supporting this hypothesis as funds with managers from top and near top MBA programs have lower expenses and turnover ratios than other funds. Yet, as with the intelligence and social connections hypotheses, this idea is not supported by our results as we control for expenses and turnover and other fund characteristics and still find that the quality of the MBA education matters in terms of fund performance.

Yet another explanation is that funds who disproportionately hire managers from prestigious MBA schools have certain qualities that we cannot measure which in turn cause better performance. Hence, rather than the manager simply being better, the argument is that items such as better support staff or better in-house research cause the fund to perform better. Unfortunately, as of now, we have insufficient data to test this hypothesis.

Hence, assuming that we cannot rationalize the results via intelligence, social connections, or other unique attributes of the fund, the results suggest that there is something about attending a top or near top MBA program that causes managers who attend these schools to have better mutual fund performance than other managers. What is this something that enables managers from top/near top MBA schools to perform better? We have two explanations.

First, it may be that managers who attend top or near top MBA programs are, on average, superior managers because they have learned to think in a manner that is not taught in lower level MBA programs or the CFA program. In an analysis of MBA programs and the CFA program, we find that top and near top MBA programs put much more emphasis on communal learning than low-level MBA schools or the CFA program. For instance, most of the top and near top MBA schools have full-time programs where students are placed in cohort groups that work on papers, presentations, and problems together throughout the entire year. Furthermore, students and faculty are strongly encouraged to have discourse in the classroom. Indeed, at some of the top programs, such as Stanford and Harvard, a major portion of the MBA website is allocated to describing how the program is set up for students to take intellectual risks in the classroom by asking questions and bringing forth ideas that might be outside the realm of a regular class. Conversely, for students at low-level MBA schools, the primary program is usually a part-time MBA that may take as many as five years to complete. Students usually have full-time jobs and/or family obligations and hence the amount of time that students work together on projects is very limited. Similarly, in the CFA program, the learning is typically done in a part-time fashion in which students do most of the studying for the program on their own. Hence, if communal learning does produce better investment decision making, it stands to reason that these managers from top and near top MBA schools will do better in terms of mutual fund performance.

A second reason for the superior mutual fund performance of managers who graduated from top and near top MBA programs is that these MBA programs have curricula that are superior to those offered by other MBA schools or even the CFA program. In a survey of MBA programs, we found that the average number of finance courses offered at a top 30 MBA program to be slightly over 20 courses while at the low-level MBA programs, the average number of finance courses was 13 (we adjusted these numbers to account for the fact that some programs have quarter systems and that others operate on semester systems). Moreover, the courses offered at the top and near top MBA programs are much more current, at least by title, than those at lower level schools or the CFA program. For example, Northwestern and a few other programs have a specific course in real options. In contrast, the curricula offered at lower-level MBA programs and in CFA preparation[31] do not specifically address these issues. One obvious explanation for these differences is that the top and near top programs usually have doctoral programs in addition to their MBA programs. Such programs require more full-time faculty, hence increasing the breadth of courses. Further, such programs require that faculty are actively engaged in research, which means that the courses will be more "state of the art" than those at lower level programs. Hence, it may very well be that the research conducted by professors makes for better learning by MBA students.

6. Conclusions

This paper examines the relationship between manager education and mutual fund performance. Similar to Chevalier and Ellison (1999a), we examine if the quality of the undergraduate institution attended by a fund manager (as measured by the mean composite SAT score) affects performance after controlling for expenses, turnover, fund size, style effects, age, and tenure. In addition, we investigate if the *Business Week* quality of the MBA

[31] We found this information by looking at recent CFA preparation books. The official source of the topics that CFA students must know is contained in the CFA Candidate Body of Knowledge. See http://www.cfainstitute.org/cfaprogram/pdf/cbok.pdf for more information on the Candidate Body of Knowledge.

program (as measured by the mean GMAT score of the business school or ranking) has any effect on performance. We also relate fund performance to other education variables such as whether the manager went to a liberal arts undergraduate institution; holds a CFA designation; holds a masters level non-MBA graduate degree; or holds a Ph.D. We identify several notable results.

First, we find that the mean GMAT score of the MBA program that the fund manager graduated from is positively and significantly related to fund performance over the 2000–2003 period. Hence, after adjusting for expenses, turnover, and many other fund and manager characteristics we find that managers that attended more prestigious MBA programs do better than other managers.

Second, when we use categorical dummy variables based on GMAT scores or Business Week rankings, we find that the relationship of MBA quality to fund performance is somewhat non-linear. While managers from top MBA programs perform better than non-MBA managers, we find little difference in the performance of managers who attended the top ranked MBA programs versus the managers who attended a near top MBA program. Conversely, we find point estimates that indicate that managers who graduated from the lowest level MBA programs have lower performance than managers who do not hold MBA degrees. Furthermore, when we compare managers who hold the lowest level MBAs to managers who hold MBAs from the top and near top programs, we find strong evidence that top and near top MBA managers perform significantly better than the low-level MBA managers.

Third, unlike Chevalier and Ellison, we find that the quality of the undergraduate degree (as measured by the mean SAT of the undergraduate institution) is not related to fund performance. If we take these results at face value, they indicate that the quality of the manager's undergraduate degree does not matter for mutual fund performance. Our results may be due to our method for dealing with survivorship bias. As we described above, in an earlier version of this paper in which we use the weighted average returns of all the surviving funds of the same style to fill in the returns of funds that drop out of the sample, we did find that the SAT variable was generally significant at the 10 percent level.

Fourth, we find that other education variables, such as whether the manager attended a liberal arts undergraduate institution, attained a CFA designation, holds a masters-level graduate degree other than an MBA, or holds a Ph.D., are unrelated to mutual fund performance. These results suggest that smaller classes (as offered by liberal arts schools) and other non-MBA education do not help managers attain better fund performance.

Our results are informative for investors, future managers, and fund companies. The results from this paper indicate that investors, in their relentless search for funds with superior performance, should consider funds with managers from high prestige MBA programs. Knowledge acquired in top or near top MBA programs may enhance the manager's ability to identify performance-enhancing inefficiencies in the market. For students or individuals interested in pursuing graduate education in order to obtain fund management knowledge, our results suggest that obtaining an MBA from a top or near top program is worthwhile. A fund that wishes to maximize expected performance may wish to hire managers from top or near top MBA programs.

Appendix A. Algorithm used to find "closest surviving fund"

Using the Morningstar data disks, we create four samples of funds from which to choose the closest surviving fund. These are January 2000 (data as of December 31, 1999), January 2001 (data as of December 31, 2000), January 2002 (data as of December 31, 2001) and January 2003

(data as of December 31, 2002). When a fund disappears due to manager change, liquidation, or merger, we choose the closest surviving fund from the sample associated with the January of the year when the fund disappeared. For example, if a fund manager changed in February 2001, the closest surviving fund is chosen from a sample of funds from the January 2001 Morningstar data disk (data as of December 31, 2000). Likewise, if a fund manager changed in February 2003, the closest surviving fund is chosen from a sample of funds from the January 2003 Morningstar data disk (data as of December 31, 2002).

Using this sampling methodology, we then use the following algorithm to identify the closest surviving fund.

1. All potential surviving funds are filtered to only include funds with the same prospectus objective as the fund that has dropped out of the sample (due to manager change, liquidation or merger);
2. Following Step 1, the remaining surviving funds are then filtered to only include those with expense ratios, turnover, and asset size (as of December 31, 1999) between 25 and 200 percent[32] of the fund that has dropped out of the sample,
   If funds survive filters 1 and 2, we then:
3. Pick the fund with a manager that has the most similar educational background to that of the manager of the fund that has dropped out of the sample. More specifically, we pick the fund whose manager graduated with an MBA from a school with a mean GMAT closest to that the manager of the fund that has dropped out of the sample. If the manager of the fund that drops out of the sample did not hold an MBA degree, we then pick the fund whose manager graduated with an undergraduate degree with a mean SAT closest to that of the manager of the fund that has dropped out of the sample,
   If no funds survive filters 1 and 2, then:
4. We repeat Step 1 and then the remaining surviving funds are filtered to only include those with expenses between 25 and 200 percent of the fund that has dropped out of the sample. We then repeat Step 3.
   If no funds survive filter 4, then
5. We repeat Step 1 and then the remaining surviving funds are filtered to only include those with turnover between 25 and 200 percent of the fund that has dropped out of the sample. We then repeat Step 3,If no fund survive filter 5, then
6. We repeat Step 1 and then the remaining surviving funds are filtered to only include those with net assets between 25 and 200 percent of the fund that has dropped out of the sample. We then repeat Step 3.Of the 518 fund in our sample, there were 275 funds that dropped out of the sample before December 31, 2003. In terms of the matching algorithm, 244 of the 275 funds were matched using 1 Steps 2 Steps 3; 29 funds were matched using Steps 4; 1 fund was matched using Steps 5; and 1 fund was matched using Steps 6.

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[32] The 25 to 200 percent boundary follows Loughran and Ritter (1997).

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