NBER WORKING PAPER SERIES

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Judith Chevalier
Glenn Ellison

Working Paper 5852

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
December 1996

We would like to thank Canice Prendergast and Jeremy Stein for their comments and Kent Daniel for providing us with the data used in section 6. Both authors wish to thank the National Science Foundation (SBR 94-14141, SBR 95-15076). The first author also acknowledges research support from the Graduate School of Business at the University of Chicago, and the second received support from a Sloan Research Fellowship. Faris Mansour and Kevin Hartmann provided excellent research assistance. This paper is part of NBER's research programs in Asset Pricing, Corporate Finance and Industrial Organization. Any opinions expressed are those of the authors and not those of the National Bureau of Economic Research.

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JEL Nos. G23, G14, J41
Asset Pricing, Corporate Finance and
Industrial Organization

ABSTRACT

In this paper we explore cross-sectional differences in the behavior and performance of mutual fund managers. In our simplest regression of a fund's market excess return on characteristics of its manager we find that younger managers earn much higher returns than older managers and that managers who attended colleges with higher average SAT scores earn much higher returns than do managers from less selective institutions. These differences appear to derive both from systematic differences in expense ratios and risk-taking behavior and from additional systematic differences in performance — managers from higher SAT schools have higher risk-adjusted excess returns. Managers with the "best" characteristics may on average beat the market. The paper also presents a preliminary look at the labor market for mutual fund managers. Our data suggest that managerial turnover is more performance sensitive for younger managers.

Judith Chevalier
Graduate School of Business
University of Chicago
1101 East 58th Street
Chicago, IL 60637
and NBER
judy.chevalier@gsb.uchicago.edu

Glenn Ellison
Department of Economics
Massachusetts Institute of Technology
E52-373
Cambridge, MA 02139
and NBER
gellison@mit.edu

1 Introduction

The financial press produces a tremendous volume and variety of information about mutual funds. Advertisements trumpet past returns, profiles of fund managers are a staple of many financial magazines, and managerial changes at large funds merit front page stories in newspaper business sections. Certainly one gets the impression from these stories that investors believe that the mutual fund market is far from efficient and that they need to pay a great deal of attention to who is managing their money.

Such behavior naturally leads one to wonder what information can be gleaned from a manager profile. Are there systematic differences in the ways in which managers behave? Are some fund managers are simply better than others? We explore these questions by looking cross-sectionally at whether the behavior and performance of mutual funds are related to some observable characteristics of fund managers which may be indicative of a manager's ability, knowledge, effort or current career concerns. In particular our data contain a manager's age, the name (and average SAT scores) of the institution from which he/she received his/her undergraduate degree, whether he/she has an MBA, and how long a manager has held his/her current position. We look at whether managers' characteristics are predictive of fund excess returns and at how risk-taking, expenses charged, investment styles, etc. vary for different types of managers.

In the literature to date, these questions have received very little direct attention.[1] The literature on mutual fund performance has focused on two related questions. There is a large literature which examines the question of whether mutual fund companies on average possess stock-picking or market-timing ability. [2]. The second major strand of the literature pursues the question of whether mutual fund performance exhibits persistence over time. The consensus of this "hot hands" literature seems to be that there is some persistence in

[1]One paper with is relevant is that of Khorana (1996), which examines instances in which funds change managers and documents the characteristics of fund performance which tend to precipitate manager turnover. While Khorana notes that fund companies are behaving *as if* there are ability differences between managers in that poor performance precipitates managerial turnover, he does not look directly at whether changing managers actually does affect fund performance.

[2]Malkiel (1995) presents results on average performance, and surveys the prior literature on this issue

fund performance, so that consumers would do better to invest in some funds than others.[3] The literature is less clear, however, on whether there is any evidence of some funds having superior "stock picking" ability, or whether the persistence of returns can be attributed solely to differences in expenses charged and to the consistent underperformance of a few laggards.[4]

The part of our paper which examines fund performance can thought of as departing from the "hot hands" literature in two ways. First, we focus on managers rather than funds. Given the high managerial turnover in the mutual fund industry the distinction between funds and managers need not be trivial empirically, and in fact our results do come down on the side of there being differences in stock-picking ability.[5] Second, we look at performance cross-sectionally instead of looking for time series correlations in returns. While this is motivated in part by a desire to know whether performance is related to observable characteristics, the choice also reflects the short time horizon over which reliable data on fund managers identities has been available.

For a first look at whether managerial characteristics help predict returns, we perform a regression on annual data with the simple excess return of a mutual fund as the dependent variable. In a sample containing 2029 fund-years for growth and growth and income mutual funds over the 1988-1994 period, we find that a manager's age, the average SAT score of his/her undergraduate institution, and whether he/she has an MBA all have strikingly large effects on a fund's predicted return, and that the first two effects are highly statistically significant. A manager who graduates from one of the best schools in our sample would be expected to achieve an annual return which is more than one percentage point per year higher than that of a manager who attended a school of the median quality. Older managers

[3]Hendricks, Patel, and Zeckhauser (1993), Goetzmann and Ibbotson (1994), Brown and Goetzmann (1995), and Gruber (1996) find evidence of persistence in fund performance over relatively short horizons (one to three years). Grinblatt and Titman (1992), Elton, Gruber, Das and Hlavka (1993), and Lehman and Modest (1987) suggest that a fund's current performance can predict performance five to ten years into the future. Malkiel (1995), however, concludes that mutual fund performance persistence was an important phenomenon in the 1970s, but broke down in the 1980s.

[4]Carhart (1995) suggests that most of the after expenses performance persistence can be attributed to the one year momentum effect of Jegadeesh and Titman (1993) in the underlying stock returns, with much of the remaining persistence attributable to the worst-performing funds.

[5]In our sample 18% of the funds change managers between 1993 and 1994.

perform much worse than younger ones: a manager who is 20 years older than another on average achieves a return which is 1.7 percentage points lower. Managers who have MBAs earn about 60 basis points per year more than managers who do not.

The bulk of the paper is then motivated by a desire to better understand why these dramatic patterns exist. We examine how fund sizes, expenses charged, holdings of systematic risk, managerial styles (such as the propensity to purchase "glamour" stocks with a high market value relative to book value) and the propensity of a manager to be replaced as a function of past performance tend to differ for managers with different characteristics. A number of interesting cross-sectional patterns can be observed. Among many other results, we find that young and high-SAT managers tend to work for funds which charge lower expense ratios, that high-SAT managers and managers with MBAs tend to hold higher beta portfolios, that MBAs hold more "glamour" stocks and that younger managers are more likely to be replaced after a bad year.

On the question of whether some managers really are better than others, we note that the superior performance of MBAs which one sees in the raw data is fully accounted for when one controls for differences in holdings of systematic risk. A large portion of the superior performance of younger managers is attributable to their working for funds which charge lower expenses and to survivorship biases created by the increased performance-sensitivity of their segment of the "labor" market. We do find, however, that there remain substantial performance differences between funds managed by managers from high-SAT schools and funds managed by managers from low-SAT schools (and perhaps also between young and old managers) which are not explained by observable differences in behavior or by survivorship biases.

Our favored interpretation of this result is that some managers are indeed better than others. Such a conclusion need not be surprising if one thinks of the job of a mutual fund manager as one of gathering and analyzing information in an asset market which is only nearly efficient. This view of the industry is also compatible with the fact that the mean fund in our sample does earn back a portion of its expenses in the form of above market pre-expense returns. While we are less confident in our estimates of mean return levels, our estimates suggest that some low expense/high manager SAT funds may be expected to beat the market in an after-expenses calculation as well. The existence of funds which will in expectation beat the market provides a potential justification for the effort which many consumers expend in choosing between funds rather than simply investing in indexes.

The remainder of the paper proceeds as follows. In Section 2, we describe our data. In Section 3, we present the basic stylized facts about performance. In Section 4, we examine the relationship between our managerial characteristics variables, holdings of systematic risk, and observable characteristics of the funds such as expenses and turnover. In Section 5 we look at fund closings and the managerial labor market and examine the possibility that survivorship biases cause our measured differences in performance. Section 6 examines the possibility that the performance differences can be accounted for by differences in observable management styles. Section 7 looks at whether "good" managers systematically beat the market, and Section 8 discusses patterns in the holding of unsystematic risk.

2 Data

The majority of our data are obtained from Morningstar Inc. We use as our starting sample the set of growth and growth and income mutal funds listed in Morningstar's March 1994 *Mutual Funds OnDisc* CD-ROM. From the March 1994 CD we obtained monthly returns, expense ratios, assets under management, and turnover ratios for these funds along with information on their current managers. The CDs give for each fund the name(s) of the fund's manager(s) along with a brief biographical sketch which includes the manager's start date, all undergraduate and graduate degrees received, the years in which the degrees were granted, and the names of the degree-granting institutions (as well as hobbies, etc.) Using the Morningstar CDs and the Morningstar Mutual Fund Sourcebook at approximately annual intervals, going backward to 1985 and forward through 1995 we checked the information from the March 1994 CD and added information about earlier and later fund managers.[6] Records of fund name changes from Morningstar were used to verify our tracking of the

[6]The starting date field in the Morningstar CD was the most error-prone category. By moving backward year by year for each fund, we believe that we were able to correct many of these errors.

funds.

We used the data from the biographical sketches to create four manager characteristic variables.[7] Using information in the sketches we compiled an MBA dummy and a manager tenure variable. We constructed an approximate manager age variable by assuming that each manager was 21 years old upon graduation from college. Finally, in hopes of obtaining a variable which might reflect the manager's "ability", effort, or the quality of his training, we recorded the average SAT score of students at the institution from which the manager received his undergraduate degree.

The construction of this latter variable was somewhat involved. We first looked up each manager's undergraduate institution in the 22nd (1993) edition of *Lovejoy's College Guide*. Most schools reported and upper and lower bound for the verbal and math SAT sections. The bounds are supposed to be constructed so that the middle 50% of students attending the school lie between the upper and lower bounds. We approximated each school's composite SAT score as the average of the upper and lower bounds for the verbal score plus the average of the upper and lower bounds for the math scores. In some cases the SAT scores were missing or reported only in different formats, or the college names found in the biographical sketches were ambiguous. The Appendix describes how we dealt with these cases.

In order to compute risk-adjusted excess returns and to explore management styles we obtained a number of monthly return time series from Kent Daniel. One of these variables is the return on the value weighted NYSE/AMEX/NASDAQ composite index minus the risk free rate, which we refer to as the RMRF series. The recent finance literature suggests that in addition to systematic risk, market capitalization, the book-to-market ratio, and past returns have power in explaining cross-sectional patterns in stock returns.[8] For this reason we obtained also monthly returns on three other portfolios. The HML portfolio is a zero investment portfolio constructed by subtracting the returns of low book to market ratio

[7]Our analysis focuses on those fund-years in which Morningstar recorded that, as of December 31st of the previous year, a single manager was responsible for the fund. While the data sometimes lists the names of each member of a management team, it is often not clear whether all of the managers listed contribute equally to the management of the fund, or whether one of the listed managers is the lead manager, and we thus felt that it would be problematic to generate metrics of manager characteristics in such cases.

[8]See Fama and French (1993), Jegadeesh and Titman (1993), and Carhart (1995).

stocks from the returns of high book to market ratio stocks. The SMB portfolio is a zero-investment portfolio constructed by subtracting the returns of large market capitalization firms from the stock returns of small market capitalization firms. Finally, the PR1YR portfolio is a zero-investment portfolio constructed as the spread between the performance of stocks which were in the top-30% of returns in the prior twelve months and those which were in the bottom 30%. The exact construction of the portfolios is detailed in Daniel and Titman (1996). Summary statistics for all of the above variables on the sample of funds for which the return and manager characteristics variables were available are shown in Table 1.

3 Do manager characteristics predict performance?

In this section, we present a simple first look at whether manager characteristics predict the cross-sectional distribution of mutual fund returns. For each fund-year in our sample, we calculate the simple excess return of the mutual fund. That is, we calculate the fund's annual return minus the annual return on the value-weighted NYSE/AMEX/NASDAQ composite index.

We examine whether the fund's performance in year t is related to the characteristics of the manager who was in charge of the fund on December 31 of year $t-1$.[9] The manager characteristics which we use are: the mean composite SAT score at the undergraduate institution attended by the fund manager, a dummy variable which equals one if the manager undertook an MBA, the manager's age, and the manager's tenure. We also include a dummy variable which equals one for growth and income funds. The omitted category, then, is growth funds.

The regression results are reported in Table 2. Heteroskedasticity-robust standard errors are shown in parentheses. The point estimates suggest that managers from higher SAT

[9] If the manager of the fund changes during year t, we do not ascribe the fund's performance to the new manager until year t+1. We make this decision because we do not want to use a methodology which introduces look-ahead biases. However, we have rerun these specifications dropping out returns in years in which there were management changes (and thus, performance can not cleanly be ascribed to a single manager). The fit and significance of the basic results we describe here improve somewhat, but are qualitatively similar to the results which we present.

schools, younger managers and managers with MBA's earn higher returns. The coefficients on SAT scores and age are each significant at the 1% level, and that the MBA coefficient is significant at the 11% level. The magnitudes of the coefficients are strikingly large. For example, a manager who attended the 4th highest SAT score school in our sample, Princeton (composite 1355), would be expected to outperform a manager from the University of Florida (composite 1145), by about one percentage point per year.[10]

Older managers seem to fare much worse than their younger counterparts. A manager who is one year older than another is expected to achieve a return which is 8.6 basis points lower. Thus, the predicted performance difference between the youngest manager in our sample (26 years old) and the oldest manager (80 years old) is approximately 4.6 percentage points (or 460 basis points) per year. The point estimate on MBAs is that a manager who has an MBA on average outperforms a non-MBA manager by 63 basis points per year. The regression coefficients indicate that fund performance also decreases slightly with tenure, but this effect is not statistically different from zero.

4 Risk, expenses, turnover, and fund size

In the previous section we saw that managers with different characteristics systematically produce very different returns. One conclusion we would draw from this is that there must be cross-sectional differences in manager behavior, a subject we begin to explore in this section. The existence of systematic differences in returns also raises two market efficiency questions: are consumers rational in their investment choices and are some managers better than others at choosing investments? To address these questions we look at whether the superior performance of some groups of managers can be attributed to differences in risk taking (in which case all markets might be efficient) and/or to differences in expense ratios (in which case consumers may not be rational but there need not be any stock-picking ability.)

[10] University of Florida's average SAT score of 1145 is close to the mean score of 1142 found in our sample.

4.1 Systematic risk

We calculate a beta for each mutual fund-year in our sample by regressing the fund's monthly returns in that year on the monthly return of the market minus the risk free rate. While the twelve month horizon gives us fewer data points for the estimation than one might want, we wanted to avoid longer horizons because of the possibility of a fund's riskiness changing over time.

In column 1 of Table 3, we list the coefficient estimates from a regression of funds' betas on the manager characteristics described previously. Newey-West standard errors are used throughout this section because we would expect that residuals for a single fund for different years to be serially correlated. Managers from high-SAT schools and those who hold MBAs are more likely to manage higher beta funds. The latter estimate reflects the fact that the mean beta in our sample for funds managed by a non-MBA manager is 0.93, while the mean beta among funds managed by an MBA is 1.00. Managers with longer tenure choose significantly lower betas. The point estimate indicates that older managers choose higher betas. The age effect is, however, not statistically significant at standard confidence levels.

Clearly, we are interested not only in the existence of behavioral differences between managers, but we are also interested in the extent to which performance differences between managers persist when we control for behavioral differences. Table 6 shows how the apparent the relationship between excess returns and manager characteristics changes as we control for each of the behavioral factors which we examine in the paper. At this point, the first two columns of the Table 6 are of interest. Column 1 reports a basic regression which uses simple excess returns as the dependent variable (from which we have dropped the insignificant tenure variable.) Column 2 shows the effect of using risk-adjusted excess returns rather than simple excess returns as the dependent variable. Given the patterns in risk-taking noted above it should not be surprising that the risk adjustments affect the return-characteristics relationship. Most notably the coefficient on MBA drops from 0.63 to 0.04 inidcating that the higher returns achieved by MBAs are almost completely attributable to their taking on more systematic risk. The SAT effect is reduced in magnitude by about one-fifth when one controls for differences in systematic risk, but remains highly statistically significant and large in practical terms. As would be expected given that younger managers do not appear to take on more systematic risk, their performance advantage remanins large and highly significant.

4.2 Job characteristics and other behaviors

As mentioned earlier, one conclusion of the hot hands literature is that expense differences between funds seem to be associated with performance differences. One potential explanation for our findings might then be that there are systematic differences in the jobs held by different types of managers which result in their having different expense ratios.

To look at potential sources of diffences in expenses, the second through fourth columns of Table 3 report regressions in which the dependent variables are the logarithm of a fund's assets under management at the start of the year, its expense ratio, and its turnover, respectively. The estimates are that managers from high SAT schools have lower expenses and turnover, and manage larger funds than managers from lower-SAT schools. The expense and turnover effects are significantly different from zero at the 1 percent level. Note that an indirect benefit of working for larger funds is that such funds also have lower expenses. Managers who have MBAs also manage larger funds with lower expenses and lower turnover rates, although here, only the fund size effect is statistically different from zero at standard confidence levels. Finally, older managers are associated with smaller, higher expense funds. Both of these effects are statistically different from zero at the one percent confidence level. The magnitudes of some of these effects are substantial. For example, even after controlling for fund size differences, a fund managed by a 55 year-old manager would be expected to have an expense ratio which is more than 50 basis points per year higher than the expense ratio of a fund managed by a 30 year-old.

Turning to the question of whether these differences in expenses are sufficient to account for the performance differences found earlier, we report in the third column of Table 6 a regression of risk-adjusted returns on manager characteristics which includes a fund's expense ratio, start-of-year assets under management and turnover ratio as explanatory variables.

Lagged values of the expense ratio and the turnover ratio were used as instruments for these variables in the estimation. We find expenses to be highly significant. That the point estimate on the expense variable is greater than one in magnitude suggests that funds with high expense ratios may also have high unreported expenses. In connection with this it is also interesting that turnover has a positive coefficient whenever it is included along with expenses. One story consistent with this is that the combination of high expenses and low turnover is indicative of managerial slack, whereas high expenses and high turnover may mean that investors are paying to have a lot of research done.

While expenses are of tremendous practical importance, controlling for expense differences is still not sufficient to explain the superior performance of managers from higher-SAT schools and younger managers. The coefficient on the SAT variable is reduced in magnitude by a bit less than one-fifth by the inclusion of the three extra variables, but remains significantly different from zero at the 5% level. Comparing columns 2 and 3 we see that controlling for the higher expenses charged by older managers does reduces the age coefficient by about half of its former magnitude, but that it also remains statistically different from zero at the 5% level.

5 Survivorship issues

A number of researchers have noted that estimates of the average performance of mutual funds are biased upwards by the fact that poorly performing mutual funds are more likely to liquidate or merge with other funds, thus leading the fund's history to be omitted from the many datasets which provide past histories of active funds only.[11] In this section, we look at whether survivorship biases in our data might account for some of the cross-sectional patterns we have observed. The examination of survivorship issues is also of independent interest, because it provides a preliminary look at the labor market for mutual fund managers.

[11] See, for example, Brown *et. al.* (1992), Brown and Goetzmann (1995), Carhart (1995), and Malkiel (1995).

5.1 Cross-sectional differences in fund and manager survival

While Morningstar has greatly improved the quality of its data on dead funds in recent years, there are three ways in which our estimates may be affected by survivorship biases. First, the 1994 Morningstar CD which we used to construct our base sample does not contain data for funds which were no longer in business in early 1994. Our sample from this therefore has the standard survivorship problems. Second, Morningstar did not begin publishing educational information on managers until 1990. The observations from 1988 and 1989 in our sample are obtained by backfilling educational data reported in 1990 or later, and thus the sample is further selected by the requirement that the manager remain in the industry until 1990. Third, throughout the entire period there remains the problem that our regressions include annual returns and a number of other fund characteristics, and thus we ignore partial year data on a fund in the year of its death and fund-years for which expenses or other variables are missing. If fund closure or variables being missing from our dataset is related to performance in the same calendar year, this creates an additional survivorship problem.

Because we are interested in cross-sectional patterns of returns rather than the level of excess returns, survivorship biases will affect our results if the fund death or manager disappearance processes differ for managers with different characteristics (or across segments of funds who tend to hire different types of managers). To examine whether this appears to be the case, we constructed a second sample of mutual funds. This sample took as its starting point all mutual funds which were active in 1992. We traced the performance of these funds forward through 1994, being carefully to match up funds which had changed names over the 1992-1994 time period. This yielded a starting sample of 606 mutual funds which were in existence at the end of 1992. By the end of 1995, 507 of these funds were still active.

To look at the fund survival process, we took the subsample of fund-years for which a fund had complete data for a year $t \in \{1992, 1993, 1994\}$ (942 fund-years). We performed a probit regression with the dependent variable being a dummy for whether the fund survived until the end of year $t+1$.[12] The explanatory variables for the survival probit are the fund's risk-adjusted excess return in year t (called Alpha in the table), the characteristics of the manager who was managing the fund on December 31st of year $t-1$ (Age, SAT, and MBA), the characteristics interacted with the excess return and control variables for the fund's size and age and the manager's tenure. Note that in this model there are two channels through which survivorship biases might arise. First, if, for example, the coefficient on SAT were negative, then because it is more difficult for a fund managed by a high SAT manager to survive, such funds which did survive would be expected to display superior performance. Second, if the coefficient on the SAT-excess return interaction were positive then survival would be more performance-sensitive for high SAT funds. Again in such a situation the high SAT funds would display superior performance in the sample of survivors.

The results of the probit regression are reported in the left column of Table 4. The positive significant coefficient on period t excess returns indicates as expected that better performing funds are more likely to survive.[13] Neither the SAT variable, nor the SAT-return interaction are statistically significant, with the point estimates on both being positive (in which case the two selection biases would work in opposite directions). The Age-return interaction is negative and significant indicating that fund survival is more performance sensitive for funds managed by younger managers. This negative coefficient suggests that survivorship bias would make younger managers appear to outperform older managers.

The right column of Table 4 examines the process by which fund managers disappear from the universe of funds in our data. This process is relevant because for the 1988-1989 period, we fill in a manager's characteristics only if that manager is still managing some growth or growth and income fund listed on Morningstar in 1990. The set of observations in the regression is the 903 fund-years for which the fund had complete data for a year $t \in \{1992, 1993, 1994\}$ and the fund survived to the end of year $t+1$. The dependent

[12]In order to include the 1994 observations in these regressions, we looked to see whether these funds survived to the end of 1995. We have not made any other use of the data from 1995 because in the data available to us expense and/or turnover figures were missing for the majority of funds.

[13]Brown and Goetzmann (1995) had found this to be the case in similar regressions. In unreported regressions we found that the coefficient estimates on additional lagged returns were negative. Their inclusion did not significantly affect the coefficient estimates for the manager characteristics nor for the manager characteristic-return interactions.

variable is a dummy variable for whether the December 31st of year $t-1$ manager remained in our dataset (at this fund or another) at the end of year t. The explanatory variables are as in the previous regression. Again we find a performance effect — poorly performing managers are more likely to disappear. The coefficients on SAT and on the SAT-return interaction are again positive and insignificant. A negative and statistically significant Age-return interaction indicates that conditional on the fund surviving, the survival of the manager (or his ability to get another job) is also again more performance sensitive for younger managers. The backfilling of the manager characteristics in the 1988-1989 sample may thus create an additional bias toward finding that younger managers perform better.

Thus far we have considered the possibility that poor performance this year may lead to a fund or manager disappearing next year. An additional potential source of survivorship bias is that a manager's poor performance early in a year might lead to the fund's closure or his disappearance later that year. As one test for whether such selection might be important, we examined whether a fund's death anytime between March and December of year t could be linked to January and February performance in year t. Further, we checked whether a fund's within-year disappearance probability was linked to the manager's age or SAT or an interaction between the manager's age or SAT and January-February performance. We found no significant evidence of such linkages.

5.2 Effects of survivorship

We take two separate approaches to assess whether survivorship biases might be responsible for the cross-sectional patterns we've found in excess returns. The first approach we take is to rerun our regressions on the reduced-survivorship bias sample discussed in the previous subsection. The fourth column of Table 6 reports the results of reestimating the regression in the third column on this sample. Comparing the two columns we see that the SAT coefficient is somewhat smaller and given the smaller sample size it is no longer significant at the 5% level. The age coefficent loses almost two-thirds of its former magnitude and becomes insignificant.

Given that the above approach entails throwing out more than half of our data, we tried also to obtain more precise survivorship-corrected estimates by using Heckman-style corrections. Thus, these specifications use our original, larger dataset but correct the estimates for survivorship biases. The goal of these Heckman-style specifications is to correct for the fact that our 1990-1992 data excludes funds which did not survive to 1993, while the 1988-1989 subsample excludes both managers who did not survive to 1990 and funds which did not survived to 1993. Our sample selection problem does not correspond exactly with the textbook truncated regression model because the selection equation includes an interaction between the manager characteristics and excess returns. Given the availability of the later sample which is not subject to these selection biases, however, the selection model is not hard to estimate.

Formally, suppose that the pre-1993 data generating process takes the form

$$\begin{aligned} s_i &= (x_{1i}\gamma)r_i + x_{2i}\delta + \epsilon_{1i} \\ s_i^* &= 1 \text{ if } s_i > 0 \text{ and } 0 \text{ otherwise.} \\ r_i &= x_{3i}\beta + \epsilon_{2i}, \end{aligned}$$

where s_i^* is an indicator for whether a fund (and manager) survives, r_i is the fund's excess return, ϵ_{1i} and ϵ_{2i} are independent mean zero normal random variables. Suppose also that $\text{Var}(\epsilon_{1i}) = 1$, $\text{Var}(\epsilon_{2i}) = \sigma_{2i}^2$, and the various $x's$ and the dependent variables are only observed if $s_i^* = 1$. In this model we have

$$E(\epsilon_{2i}|s_i^* = 1, x_{1i}, x_{2i}, x_{3i}) = \frac{(x_{1i}\gamma)\sigma_{2i}^2}{\sqrt{1 + (x_{1i}\gamma)\sigma_{2i}^2}}\lambda\left(\frac{(x_{1i}\gamma)x_{3i}\beta + x_{2i}\delta}{\sqrt{1 + (x_{1i}\gamma)\sigma_{2i}^2}}\right), \tag{1}$$

where $\lambda(z) = \phi(z)/\Phi(z)$ is the ratio of the standard normal pdf to the standard normal CDF. We can thus obtain consistent estimates of β on the full sample by a two step process: first using the survivorship bias-free sample we estimate γ, δ, β, and $\sigma_2(x)$. For each of the pre-93 observations we form a Heckman-style correction term h_i by plugging the first-stage parameter estimates into (1). On the full sample we can then estimate β by regressing of $r_i - h_i$ on x_{3i}.

The particulars of our estimation procedure are that the Heckman terms for the 1990-1992 period are generated by taking fund survival as the dependent variable in the selection equation, while the 1988-1989 terms use the interaction of fund and the manager survival as the selection variable. The x_1, x_2, and x_3 variables are those which have been used previously in the regressions in Tables 4 and 6, and ϵ_{2i} was assumed to be possibly heteroskedastic with a variance which is linear in a fund's unsystematic risk level, $UnsysRisk_i$. The unsystematic risk variable is the standard deviation of the residuals from a regression of the fund's monthly returns on the monthly returns of the value-weighted NYSE/AMEX/NASDAQ composite.

The survival equation was estimated by a simple probit regression. The first stage regression of returns on characteristics was estimated by GMM using lagged values of expenses and turnover as instruments for current values of expenses and turnover. The final estimates were then obtained from another instrumental variables regression, with the standard errors being corrected for the presence of the Heckman term. The mean value of the Heckman correction for the 1988-1989 sample is 0.53 (*i.e.* survivorship bias is predicted to make us overestimate the performance of the median fund by 53 basis points in these years), while the mean value for the 1990-1992 sample is 0.14.[14]

The results of this estimation are presented in the fifth column of Table 4. The new estimate of the SAT coefficient lies between the previous two estimates, and is again significant at the 5% level. The results on age are also intermediate. The regression with the Heckman correction suggests that one-third of the age effect in column three is due to survivorship, which is less of an attenuation than was apparent in the fourth column. With the larger sample, the age coefficient is statistically significant at the 15 % level.

6 Investment Styles

Recent literature in finance has described characteristics of portfolios which consistently have power in explaining cross-sectional stock returns. For example, Fama and French (1992), emphasize the fact that the stocks of small firms have consistently outperformed the shares of large firms. They construct a zero-investment portfolio in which shares of small

[14]Our results are thus similar to Grinblatt and Titman (1989a) and Brown and Goetzmann (1995) (in the later years of their sample) who find that survivorship bias adds 10 to 40 basis points per year to average performance. Malkiel (1995) argues that biases in this period are much larger — 50 to 100 basis points.

firms are bought and shares of large firms are sold. This portfolio is the SMB portfolio. They argue also that the shares of firms with a high book value of assets divided by market value of assets outperform the market portfolio. They construct a zero-investment portfolio in which shares of high book to market stocks are purchased and shares of low book to market stocks are sold. This portfolio is the HML portfolio.

Jegadeesh and Titman (1993) show that firms which outperformed the market portfolio last year also tend to outperform the market this year. They construct a portfolio, PR1YR, in which last year's winners are bought, and last years losers are sold.

We remain agnostic on the question of whether the portfolios appear to be priced in the market because they truly represent risk factors, or whether these portfolios simply classify categories of stock-selection styles which have performed well in the past. In either case, however, we feel that it is interesting to explore cross-sectional patterns in management styles and valuable to know what fraction of the differences between managers of different characteristics is attributable to the covariance of the manager's portfolio with these four factors. Residual excess performance can be characterized as the stock-picking ability on the manager's part which is orthogonal to these performance factors.

For each fund-year in our sample, we constructed factor weightings by regressing the monthly return of the mutual fund on the monthly return of the RMRF portfolio, the HML portfolio, the SMB portfolio and the PR1YR portfolio. We examine here whether managers with different characteristics systematically choose different investment styles.

Table 5 shows the results. Newey-West standard errors are again used here, as we would expect the residuals for a given fund to be correlated across years. In light of our findings so far that managers from high SAT schools exhibit superior performance, it is notable that no particular tendencies of the high SAT managers reveal themselves in this Table.

Two interesting tendencies are apparent in the table. First, managers with MBAs showed a statistically significant tendency to purchase "glamour" stocks — that is, stocks with low book to market ratios. Second, it appears that older managers are following momentum strategies, as evidence by the positive association between age and PR1YR.

The sixth and seventh columns of Table 6 examine the possibility that style differences might explain some of the systematic performance differences we've found. The dependent variable for each of the regressions is each fund's excess return calculated using a four-factor model. Column 6 is otherwise comparable to column 4, with the results being those from an IV regression on the 1992-1994 reduced-survivorship bias sample. Column 7 is comparable to column 5 with the results being those obtained by applying a Heckman-selection correction to the full sample. In both columns, it is clear that the overperformance of high-SAT managers is not diminished at all by using the four-factor residuals as the performance measure. This is not surprising, since the SAT variable was not highly correlated with loadings on the factor portfolios.

The coefficient for MBA is positive in this specification but not statistically significant. Recall that, in our prior analysis, we found that the tendency of MBA managers to manage high-beta funds fully explained all of the excess returns of MBA managers which were apparent using simple excess returns. The positive excess returns of MBA managers in the four factor model stems from the fact that the MBA managers are earning high returns, despite the fact that they are loading up on "glamour" stocks.

Finally, the greatest change which results from looking at four factor excess returns is that the coefficient for the age variable becomes more strongly negative and is significant at the 5% level in both samples. The coefficient on the age variable indicates that each additional year in manager age is expected to erode manager performance by approximately 4 basis points. Thus, the predicted performance difference between the a 30 year-old manager and a 55 year-old manager is about 1 percentage point per year.

7 Do good managers beat the market?

While the finding that some managers are better than others would be paradoxical in a world with efficient asset markets, it is perfectly natural in a world of informationally efficient markets. That is, the finding that some managers perform better than others is not surprising if one thinks of asset markets as having a small degree of equilibrium inefficiency determined by the cost of investing in information. If the job of a mutual fund manager (like that of many other professionals) is simply to gather and analyze information, the claim that some mutual fund managers are better than others need not be any more surprising than a claim that some geologists or economists are better than others. In this case, the interesting question is whether a mutual fund manager captures all of the returns to his ability in his wage and thus whether, after expenses, some funds can still be expected to outperform others.

Because one's interpretation of our results will vary with one's view of market efficiency, it is worth noting that in our sample funds on average earn above market returns on their investments which partially offset their expenses. In our one factor Heckman corrected model the predicted risk adjusted excess return of a fund with the mean characteristics is -0.41% per year. This is ninety five basis points higher than would be expected if funds matched the market on their investments given that the mean expense ratio is about 1.36%. The difference is significant at the 1% level. This result is roughly consistent with the previous literature.[15] However, we would like to be cautious in drawing conclusions about average performance levels. Our analysis ignores those survivorship biases which result from ignoring partial year returns in the year of a fund's death, and the standard errors are calculated assuming all fund returns are independent. In addition our sample does not extend to 1995 — a year in which mutual funds on average trailed the market.

While the average fund earns back less than three-quarters of its expenses in excess returns on its investments, our previous results naturally lead one to wonder whether better managers are able to beat the market. Our answer to this question depends on what level of expenses a manager is trying to overcome. If one looks at a fund with the mean expense ratio we find very weak evidence of managers from higher SAT schools being able to beat the market. Our point estimates indicate that a fund which otherwise had the mean characteristics would be expected to beat the market if its manager attended a school with an average SAT score above 1283. However, even for a manager from a school with the highest SAT score in our sample (1420), the predicted excess return (39 basis points) is not

[15] In the earliest study of the question, Jensen (1968) did not find significant evidence of excess pre-expense performance in the 1945-1964 period. More recent studies which control for survivorship bias have typically found positive pre-expense excess performance and negative post-expense excess performance. For example, the most recent study we've seen, Carhart (1995), finds that mutual fund simple excess returns from 1961 to 1993 average -0.5% per year while average the expense ratio is 1.14%. Malkiel (1995) appears to be the exception in claiming that pre-expense excess returns are negative.

statistically different from zero at standard confidence levels.

Because expenses are a very important predictor of returns, it is much easier for funds with lower expenses to beat the market. If one looks, for example, at a hypothetical fund with expenses at the 25th percentile in our sample (0.91%) our point estimates are that even a manager from a school with the average SAT score of 1046 (which is 100 points below the sample mean) would be expected to beat the market. The predicted excess performance of a manager with from a school with an SAT score of 1205 is 45 basis points per year which is significantly greater than zero at the 5% level. Forty seven of the 189 schools in our sample have SAT scores this high, and their alumni manage about one-third of the funds.

Overall, the distribution of expenses, SAT scores, etc. in our data are such that 38% of the funds are predicted to beat the market and for about 14% of the funds the predicted excess performance is sufficiently large as to be significant at the 5% level. We do not want to emphasize these results too much, however, both for the reasons noted above and because they involve making predictions away from the sample mean while maintaining the assumption of linearity.

8 Who takes big bets?

The final behavior of managers which we consider is their tendency to take on unsystematic risk. While unsystematic risk cannot explain performance differences between different groups of managers, examining the propensity of different groups of managers to take on unsystematic risk is potentially revealing about the incentives which managers of different characteristics face.

The rightmost column of Table 5 has, as its dependent variable our measure of a fund's unsystematic risk. The one notable feature of the regression is that older managers (and perhaps also those of longer tenure) have a tendency to take on more unsystematic risk than younger managers. This result is somewhat akin to the result in Lamont (1995) that older macroeconomic forecasters make larger deviations from the consensus forecast than do younger forecasters.

9 Conclusion

The most striking result we have reported here is that mutual fund managers who attended more selective undergraduate institutions have higher performance than mutual fund managers who attended less selective undergraduate institutions. This result can not be attributed to differences in risk characteristics, survivorship biases, differences in expense ratios, or differences in factor loadings in a four-factor model. While there is little that could be done to rule out alternative explanations such as the performance differences being due to differences in unreported expenses, we feel that the results strongly suggest that "stock-picking" ability exists. While one would regard this conclusion as surprising if one were thinking of stock markets as efficient, it is quite natural if one thinks of stock markets as being only nearly informationally efficient. It is perhaps more surprising that our preliminary examination of whether or not fund managers beat the market suggests that some managers are expected to beat the market even taking into account the expenses which they charge.

We want to emphasize that many explanations of the result that there are many possible explanations of our finding that SAT scores are predictive of performance. Obviously the result could be due to managers from higher SAT schools having higher inherent abilities, being better educated, or having lower disutility of effort. While one might expect school average ability differences to be irrelevant given that fund managers are a highly selected sample of a school's graduates, it is plausible that some managers obtain their jobs via family connections, etc., rather than on merit, and that such managers might come disproportionately from lower SAT schools. On the other hand, we know also from our cross-section regressions that managers with different characteristics tend to work for different funds. Thus, the performance results could reflect also higher SAT managers being hired into funds which have lower unreported expenses, better support staff, or which induce higher effort via better incentive packages, etc.

We also find (although the result is somewhat more fragile), that older managers have worse performance than younger managers and that the probability of getting fired is less sensitive to performance for older managers. Once again, a number of distinct mechanisms could account for the performance result. For one it is consistent with the hypothesis that managers' abilities fade over time as their education becomes outdated. In light of our firing results it also seems plausible that performance declines as older managers work less hard in response to the decreased threat of their being fired for poor performance. The results might also be consistent with the hypothesis that "better" managers tend to exit the industry (perhaps to manage institutional money) before they get old.[16]

In order to control for survivorship biases, we have also looked quickly at what makes managers disappear from our dataset, with our most interesting observation being that disappearance appears to be more performance-sensitive for younger managers. A much more detailed study of the dynamics of promotion and firing and of the changing incentives which face fund managers over the course of their careers would clearly be necessary before one could understand career concerns well enough to try to infer whether they differences in behavior are a response to career concerns. Such a study might also be useful also in helping to distinguish between the various potential explanations for our performance results. For these reasons, it is a topic which we hope to address in future work.

[16]Separating different hypotheses about why age matters is not as easy as it might at first appear. For example, one natural test might be to add "fixed effects" and ascertain whether a given manager's performance deteriorates over time. While this pattern does clearly exist in the data, it would be expected even if ability did not decline given that managers tend to be fired following poor performance.

References

Brown, Stephen J. and William N. Goetzmann (1995): "Perfomance Persistence", *The Journal of Finance* 50, 679-698.

Brown, Stephen J., William N. Goetzmann, Roger G. Ibbotson and Steven A. Ross (1992): "Survivorship Bias in Performance Studies," *Review of Financial Studies* 5, 553-580.

Carhart, Mark M. (1995): "Persistence in Mutual Fund Performance," University of Southern California Working Paper.

Daniel, Kent D. and Sheridan Titman (1996): "Evidence on the characteristics of cross-sectional variation in common stock returns," *The Journal of Finance*, forthcoming.

Elton, Edwin J., Martin J. Gruber, Sanjiv Das, and Matt Hlavka (1993): "Efficiency with Costly Information: A Re-Interpretatin of Evidence from Managed Portfolios," *Review of Financial Studies* 6, 1-21.

Fama, Eugene F. and Kenneth R. French (1992): "The Cross-Section of Expected Stock Returns," *The Journal of Finance* 47, 427-465.

Fama, Eugene F. and Kenneth R. French (1993): "Common Risk Factors in the Returns on Bonds and Stocks," *Journal of Financial Economics* 33, 3-53.

Goetzmann, William N. and Roger G. Ibbotson (1994): "Do Winners Repeat? Patterns in Mutual Fund Performance," *Journal of Portfolio Management* 20, 9-18.

Grinblatt, Mark and Sheridan Titman (1989a): "Mutual Fund Performance: An Analysis of Quarterly Portfolio Holdings," *Journal of Business* 62, 394-415.

Grinblatt, Mark and Sheridan Titman (1989b): "Portfolio Performance Evaluation: Old Issues and New Insights," *The Review of Financial Studies* 2, 394-415.

Grinblatt, Mark and Sheridan Titman (1992): "The Persistence of Mutual Fund Performance," *The Journal of Finance* 47, 1977-1984.

Gruber, Martin J. (1996): "Another Puzzle: The Growth in Actively Managed Mutual Funds," *The Journal of Finance* 51, 783-810.

Hendricks, Darryll, Jayendu Patel and Richard Zeckhauser (1993): "Hot Hands in Mutual Funds: Short-Run Persistence of Performance, 1974-1988," *The Journal of Finance* 48, 93-130.

Jegadeesh, Narasimhan and Sheridan Titman (1993): "Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency," *The Journal of Finance* 48, 65-91.

Jensen, Michael C. (1968): "The Performance of Mutual Funds in the Period 1945-1964, " *The Journal of Finance* 23, 389-416.

Khorana, Ajay (1996): "Top Management Turnover: An Empirical Investigation of Mutual Fund Managers," *Journal of Financial Economics* 40, 403-427.

Lehman, Bruce N. and David M. Modest (1987): "Mutual Fund Performance Evaluation: A Comparison of Benchmarks and Benchmark Comparisons," *The Journal of Finance* 42, 233-265.

Lamont, Owen (1995): "Macroeconomic Forecasts and Microeconomic Forecasters," NBER Working Paper 5284.

Malkiel, Burton G. (1995): "Returns from Investing in Equity Mutual Funds 1971-1991," *Journal of Finance* 50, 549-572.

Straughn, Charles T. II and Barbarasue Lovejoy Straughn, eds. (1993): *Lovejoy's College Guide*, 22nd Edition. New York: Prentice Hall.

Appendix

The first problem which occurred in matching manager's to institutional SAT scores was the situation in which several institutions share the same or similar names, and the manager's biographies do not make it clear which institution the manager attended. The following procedure (in order) was adopted in these circumstances:

(1) If the manager biography indicated the birthplace of the manager, and one of the candidate institutions was located in the manager's home state, or a state adjacent to the manager's home state, the manager was assumed to attend that institution. For example, one manager who attended "Miami University" and whose birthplace was listed as Ohio was assumed to attend the Miami University in Ohio, rather than the Miami University in Florida.

(2) If (1) did not apply, but the manager's graduate degree was from a school located in the same state, or a state adjacent to one of the candidate institutions, the manager was assumed to attend that institution. For example, one manager whose birthplace was not listed, but who received an MBA from Ohio State University was also assumed to have attended Miami University in Ohio.

(3) If neither (1) nor (2) applied, the manager was assumed to attend the larger school. This problem was most common for schools with religious affiliations. For example, there are 6 St. Joseph's Colleges in the United States. Any biases introduced by such misassignments should be small, in part because the candidate institutions tend to have very similar SAT scores.

Once a manager was assigned to an undergraduate institution, the undergraduate institution was assigned to an SAT score. The modal form of SAT assigment is described in the text. Of the 235 institutions attended by our fund managers, this methodology could be used for 144 of them. When the data in the standard form was not available, one of the following procedures below was used to assign an SAT score to each school. The methodologies are listed in their preferred order; if a lower-numbered methodology was available, it was used in preference to a higher-numbered methodology.

(1) Forty schools submitted a listing of percentage of students scoring in certain ranges. For example, a listing for verbal scores might be Verbal: 700+ 2%, 600-699 20%, 500-599 50%, 400-499 20%, 300-399 5%, under 300 3%. In this case, mid-50% ranges were estimated by interpolating. The mid-50% ranges were treated as in the text.

(2) Fourteen other schools reported mean SAT scores (sometimes composite, sometimes verbal and math) in place of mid-50% ranges. The mean scores were taken in place of the midpoint of the mid-50% ranges and were treated as in the text. This methodology was used to calculate SAT numbers for 14 schools.

(3) Twelve other schools (most in the Midwest or Southwest) reported ACT score mid-50% ranges. Using data from the schools in our sample which reported mid-50% ranges for both the ACT and SAT math and English/verbal tests, we constructed predicted mid-50% math and verbal SAT score ranges for the twelve schools which only reported ACT scores and then formed a composite SAT score as before. For example, to construct a the high endpoint of the SAT math range we used predicted values from a regression of SAT math

high on ACT math low, ACT math high, ACT math low squared, and ACT math high squared.

(4) Five other schools reported ACT English and math averages rather than mid-50% ranges. There were not enough schools reporting both SAT averages and ACT averages to run regressions as above. Thus, the regressions in (3) were rerun on the same data, using the midpoint of the SAT-50% ranges as the dependent variable, and the midpoint of the ACT-50% ranges and the midpoint squared as the independent variables. The ACT means were inserted in place of the midpoint of the ACT-50% ranges in order to calculate predicted SAT scores.

(5) Eight schools reported only ACT composite score numbers, rather than ACT English and math numbers. This posed some difficulty, because the ACT composite score includes a science test which has no analogue in the SAT (the ACT composite score is a mean, rather than a sum). Nonetheless, the ACT composite scores were treated as if they represented on English and math scores, and were treated as in (3).

(6) Twelve schools reported no standardized test scores. For these schools we did have available, Lovejoy's selectivity index which ranges from 1 to 5 and is supposed to represent Lovejoy's information about the SAT scores of admitted students as well as the GPAs of admitted students. We assigned to each of these schools the mean SAT score for the schools in our sample which had the same selectivity index and had reported SAT scores.

Table 1: Summary Statistics

Variable	# Obs.	Mean	Std. Dev.
Simple Excess Return (in percent)	2029	-0.504	8.451
Manager College SAT (/100)	2029	11.42	1.44
Manager MBA	2029	0.596	0.491
Manager Age	2029	44.176	9.684
Manager Tenure	2029	3.793	5.058
Growth-Income Dummy	2029	0.374	0.484
Alpha (market model excess return, in %)	2029	-0.502	7.862
Beta	2029	0.971	0.247
Log Assets	1907	4.359	1.913
Expense Ratio (in %)	1947	1.352	1.026
Turnover (in %)	1885	76.81	69.37
HML Weight	2029	-0.020	0.428
SMB Weight	2029	0.151	0.389
PR1YR Weight	2029	0.015	0.228
Unsys Risk (in % per month)	2029	2.573	3.402
Alpha4 (4 factor excess return, in %)	2029	-0.698	7.892

Table 2: Mutual Fund Performance and Manager Characteristics. Dependent variable is simple excess return.

Independent Variables	Coefficients
Constant	-1.704
	(1.756)
Manager College SAT	0.463
	(0.136)
Manager MBA	0.631
	(0.391)
Manager Age	-0.086
	(0.022)
Manager Tenure	0.005
	(0.046)
Growth-Income Dummy	-1.836
	(0.351)
R-squared	0.031
NOBS	2029

Heteroskedasticity robust standard errors in parentheses

Table 3: Fund Characteristics and Manager Characteristics

Independent Variables	Dependent Variables			
	Beta	Log Assets	Expense Ratio	Turnover
Constant	0.788	4.257	1.911	143.61
	(0.069)	(0.661)	(0.225)	(25.80)
Manager College SAT	0.011	0.063	-0.055	-5.09
	(0.005)	(0.054)	(0.029)	(2.19)
Manager MBA	0.067	0.393	-0.083	-1.88
	(0.016)	(0.149)	(0.054)	(5.18)
Manager Age	0.0020	-0.0261	0.0211	-0.027
	(0.0009)	(0.0085)	(0.0076)	(0.351)
Manager Tenure	-0.0055	0.054	0.023	-0.26
	(0.0020)	(0.019)	(0.017)	(0.58)
Growth-Income Dummy	-0.131	0.268	-0.006	-14.47
	(0.015)	(0.162)	(0.083)	(5.35)
Log Assets			-0.206	
			(0.031)	
R-squared	0.102	0.036	0.238	0.020
NOBS	2029	1907	1895	1885

Newey-West standard errors in parentheses

Table 4: Manager Characteristics and Survivorship

	Dependent Variables for Probit	
Independent Variables	Fund Survival	Manager Found
Constant	-0.065	0.871
	(0.773)	(0.491)
Alpha	0.111	0.117
	(0.058)	(0.046)
Manager College SAT	0.069	0.061
	(0.060)	(0.037)
Manager MBA	0.215	-0.217
	(0.168)	(0.113)
Manager Age	0.010	-0.0075
	(0.010)	(0.0061)
Alpha*(SAT-10)	0.0055	0.0037
	(0.0076)	(0.0056)
Alpha*MBA	0.024	-0.021
	(0.022)	(0.017)
Alpha*Mgr. Age	-0.0023	-0.0021
	(0.0012)	(0.0009)
Log Assets	0.109	-0.017
	(0.049)	(0.032)
Fund Age	0.021	-0.0063
	(0.011)	(0.0033)
Manager Tenure	-0.037	0.042
	(0.020)	(0.014)
NOBS	942	903

Standard errors in parentheses

Table 5: Management Styles and Manager Characteristics

Independent Variables	Dependent Variables			
	HML Wgt	SMB Wgt	PR1YR Wgt	Unsys Risk
Constant	-0.062	0.288	-0.015	2.71
	(0.118)	(0.101)	(0.053)	(0.94)
Mgr Col SAT	-0.007	-0.011	-0.001	-0.124
	(-0.009)	(0.008)	(0.004)	(0.071)
Manager MBA	-0.053	-0.020	-0.013	-0.119
	(0.024)	(0.023)	(0.012)	(0.219)
Manager Age	-0.0012	0.0013	0.0012	0.039
	(0.0014)	(0.0014)	(0.0007)	(0.015)
Manager Tenure	0.0072	0.0031	-0.0006	0.040
	(0.0032)	(0.0030)	(0.0014)	(0.027)
GI Dummy	0.158	-0.188	-0.013	-1.486
	(0.023)	(0.021)	(0.010)	(0.196)
R-squared	0.044	0.059	0.004	0.067
NOBS	2029	2029	2029	2029

Newey-West standard errors in parentheses

Table 6: More performance regressions. Various excess return measures used as dependent variables.

Independent Variables	Simple Full OLS	Beta Full OLS	Beta Full IV	Beta RSB IV	Beta Full Heck-IV	Four Factor RSB IV	Four Factor Full Heck-IV
	Excess return measure / Sample / Estimation technique						
Constant	-1.730	-0.882	-0.237	-2.134	-0.932	-0.540	1.214
	(1.787)	(1.658)	(1.988)	(2.401)	(1.753)	(1.959)	(1.492)
Mgr Col SAT	0.462	0.376	0.306	0.253	0.286	0.248	0.359
	(0.135)	(0.127)	(0.133)	(0.160)	(0.120)	(0.143)	(0.102)
Manager MBA	0.630	0.042	-0.254	0.056	-0.382	0.437	0.338
	(0.390)	(0.363)	(0.388)	(0.494)	(0.346)	(0.415)	(0.296)
Manager Age	-0.084	-0.082	-0.042	-0.015	-0.029	-0.043	-0.043
	(0.022)	(0.021)	(0.021)	(0.025)	(0.019)	(0.020)	(0.017)
GI Dummy	-1.835	-0.766	-0.512	0.888	-0.403	0.416	-0.769
	(0.351)	(0.331)	(0.356)	(0.460)	(0.336)	(0.388)	(0.288)
Expense Ratio			-1.524	-1.579	-1.509	-1.949	-2.253
			(0.325)	(0.491)	(0.350)	(0.298)	(0.292)
Log Assets			-0.061	0.138	-0.015	0.206	-0.264
			(0.124)	(0.179)	(0.116)	(0.142)	(0.098)
Turnover			0.014	0.013	0.013	-0.003	0.003
			(0.005)	(0.005)	(0.004)	(0.005)	(0.003)
R-squared	0.03	0.02	0.05	0.05	0.05	0.16	0.10
NOBS	2029	2029	1705	872	1705	872	1705

Standard errors in parentheses. RSB sample is 1992-1994 reduced-survivorship bias sample. Estimates labeled Heck-IV apply Heckman correction for survivorship.