AN EMPIRICAL STUDY OF MUTUAL FUND MANAGER'S CHARACTERISTICS

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ABSTRACT

To promote market efficiency, analysts must first study the causes of inefficiency. Because some mutual fund managers exhibit consistently superior performance, this paper uses the characteristics of funds and its managers to explain the cause of superior performance. Although differences in manager characteristics can cause different systematic behavioural patterns, the data is not readily available to the public, and more investigation is required. By examining manager characteristics in relation to their funds, the results of this paper suggest that investors should purchase those funds with low expense and that are managed by managers from high-SAT schools.

DEDICATION

To my family members and to those who supported me throughout my academic studies.

ACKNOWLEDGEMENTS

I want to say a million thanks to my supervisors, from whom I acquired more knowledge than from my studies in any other course. Your sincere help has added another level to this project's quality. Besides helping me to gain academic knowledge, your help has also made me a better person.

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1. INTRODUCTION

The Efficient Market Hypothesis implies that the price of any financial asset reflects all readily available information, and price-disparity or performance persistence-related anomalies should not exist. The booming field of behavioral finance uses social science perspectives, including psychology and sociology, to explain financial phenomena such as anomalies that can sharply contradict the Efficient Market Theory. Lamont and Thaler (2003) reviewed anomalies such as the closed-end fund discount, the premium puzzle, and the price disparity of Royal Dutch and Shell that cannot be explained by Efficient Market Theory. Moreover, numerous articles show evidence of persistence in mutual fund performance that stands against Efficient Market Theory (further discussion in the literature review). More research is required to understand these anomalies and related issues.

According to the Efficient Market Theory, past performance and public information do not provide a guide to future performance, after adjusting for risk or other pricing factors. Any excess, risk-adjusted performance is the result of luck, but not skill. If true, then we should not expect some fund managers to consistently outperform the market after risk adjustment or other managers, after expenses. Researchers in behavioral finance have found that managers who exhibit characteristics of intelligence and experience manage superior and persistently high-performing funds. The Efficient Market Theory cannot answer

this puzzle by assuming that it is the result of luck. Instead of looking for a systematic pattern of causation, proponents of the Efficient Market Hypothesis might argue that information on the experience and education of fund managers is not readily available information and that only some of the data is published in the financial press. Instead of testing the Efficient Market Hypothesis, this paper attempts to use behavioral differences in the characteristics of funds and their managers to search for the predictors of superior performance. For example: Is the education of fund managers associated with their performance? Do manager characteristics affect the fund's investment style?

The findings from this paper show that managers from higher-SAT schools have a higher probability of beating the market, and older managers, compared to younger managers, have a relative underperformance.

The results may be summarized as follows:

1. The *Sat* coefficient is positive and significant for the probit estimation.
2. Managers who are 10 years older than the average would take on 14% more unsystematic risk.
3. Managers who are 10 years older than the average would charge 2.2% more expense ratio.
4. Each percentage point increase in expenses is associated with a decrease in performance measure by at least 1.35%.

2. LITERATURE REVIEW

Early work by Jensen (1968) looked at mutual fund performance over the period, 1945-1964. He concluded that average fund performance and individual fund performance was no better than what would be predicted in a random walk. During the 1990's, the consensus of the finance literature was that mutual fund performance was persistent. Hendricks, Patel, and Zeckhausgfer (1993), Goetzmann and Ibbotson (1994), Brown and Goetzmann (1995), Wermers (1996), Carhart (1997) found evidence for short-term persistence in mutual fund performance. Carhart (1997), in particular, argued that funds earned higher one-year returns because some mutual funds just happen, by chance, to hold a relative larger position in the last year's winning stock. He argued that the short-term superior performance does not represent the superior stock-picking ability of fund managers. Grinblatt and Titman (1992) and Elton, Guber, Das, and Blake (1996) looked at mutual fund return predictability over long horizons. They attributed performance persistence to manager differential information and stock-picking ability. Nevertheless, we cannot conclude with certainty that some funds or managers have better stock-picking ability than others.

More recent studies have extended this issue by investigating whether or not better performance can be predicted from the characteristics of the funds and of the funds' managers. Prather and Middleton (2002) looked at the fund management structure and found no appreciable difference between the

performance of team-managed and individually-managed funds. Almazan, Brown, Carlson, and Chapman (2003) also concluded that policy restrictions, such as number of directors, are not associated with significant return differentials in mutual funds, while Ding and Wermers (2006) found that managers of large funds, with good track records, more experience, and more outside directors, outperform others. Again, the results are not conclusive. Elton, Gruber, and Blake (2003) examined the effect of incentive fees on the behavior of mutual managers, and found that funds with incentives have a positive stock selection ability and take on more risk than do the funds without an incentive fee. Atkinson, Baird, and Frye (2003) looked at the difference in performance and investment behavior of female and male, fixed-income mutual fund managers, and concluded that they exhibited no significant differences except in the net asset flows into funds. Female fund managers have lower net asset flows into their funds, especially during a manager's initial year. Golec (1996), Chevalier and Ellison (1999), and Gottesman and Morey (2006) studied the relationship between managers' education, age, and experience. Golec (1996) found that younger managers with MBA degrees who have longer tenure at their funds tend to have higher risk-adjusted performance. Chevalier and Ellison (1999) discovered that managers from higher SAT, undergraduate institutions have higher risk-adjusted returns. Finally, Gottesman and Morey (2006) found that managers from high GMAT schools or who had attended institutions that were ranked in the top 30 in *Business Week* have superior performance. On the other hand, other low GMAT, MBA degrees or graduate degrees, or the CFA

designation were not found to be significantly related to manager's performance. Gottesman and Morey (2006) also criticize the work of Chevalier and Ellison (1999), noting that their data was from a bull market, even though their own sample was not long enough.

Of these characteristics, good quality education seems to be strongly associated with manager performance. These previous studies have the limitation of using linear regression or similar analysis, without investigating other nonlinear relationships. As a result, this paper examines both the linear relationship and other possible nonlinear relationships between manager characteristics and performance using Chevalier and Ellison's (1999) data-set. This paper looks at mutual funds and their managers in a cross-sectional dimension. The data used to capture the managers' characteristics, including ability, consists of manager's age, average SAT score for the school attended by the manager, whether or not the manager has an MBA degree, and the length of the manager's tenure. The sample consists of 492 managers of either growth funds or growth and income funds who attended a US university for their undergraduate degree. Since the SAT score, MBA dummy, and fund category dummy are mostly time-invariant, and the sample is relatively small, a cross-sectional approach is used.

According to the Human Capital Theory, better-educated fund managers would possess higher human capital and better networking, to lead to better performance. For instance, managers from high-SAT undergrad-schools may have better networking because of the higher probability of meeting more skilled

people and of entering larger firms (screening effect). Also, they may benefit from studying in schools that have better resources and information. The finding of this paper shows that a 100-point increase in SAT average for schools is associated with an increased probability of beating the market by at least 2% point. As fund management is a high-stress and well-paid job, the effect of a fund manager's age has large impact on the fund's characteristics and performance. In particular, young managers may work harder to overcome their lack of a track record. Chevalier and Ellison (1999) found that younger managers are punished when their fund's beta and unsystematic risk deviates from the industry's mean. In this study, the data analysis supports the above predictions. In other words, younger managers are more likely to be demoted to managing a smaller fund or to be terminated. The evidence from this paper supports their conclusion, that a manager's age has a significant positive relationship with unsystematic risk.

The rest of this paper is organized as follows: Section 3 describes the data; Section 4 discuss the methodology; Section 5 looks at the simple relationship between mutual fund performance and manager characteristics; Section 6 further investigates the relationship between performance and manager characteristics; Section 7 examines the complete relationship between performance and all characteristics; Section 8 deals with the survivor-bias issues; and Section 9 discusses the implications and conclusions.

3. DATA

The data-set used in this study was previously used by Chevalier and Ellison (1999) and has been kindly provided by Prof. Ellison. Chevalier and Ellison extracted the data from Morningstar's March 1994 Mutual funds OnDisc CD-ROM. The CD-ROM contains monthly returns, expense ratios, asset size, turnover ratios, company name, and short biographies of the fund managers. The short biographies include the manager's start date, all undergraduate and graduate degrees, year of graduation, and the name of the institutions where the managers received their degree. Chevalier and Ellison (1999) added and checked the observations for other years that were available from the Morningstar mutual funds OnDisc CDs, and the Morningstar Mutual Fund Sourcebook backward to 1988 and forward to 1995. Manager characteristic variables were created from the biographical sketches. The MBA dummy (HASMBA) is equal to 1 for a manager who has an MBA, and 0 otherwise. The manager's tenure (MGRTEN) is measured in years. The manager's age (MANAGE) is approximated by assuming each manager was 21 years old upon graduation from college. The SAT variable is the average SAT score of students at the institution from which managers received their undergraduate degree, based on the 22nd edition of Lovejoy's College Guide (1993). The growth income dummy variable (GIDUM) is equal to 0 for an only growth fund, and 1 for a growth and income fund.

Several performance measures of the mutual fund are used. Simple excess return (SEXRET) is defined as the fund's annual return minus the annual return on the value-weighted NYSE/AMEX/Nasdaq composite index. Risk-adjusted excess return are calculated using the CAPM (ALPHA), and the 4-factor model (ALPHAF). The four factors are RMRF or beta, HML, SMB, and PR1YR, where:

1. The *RMRF* factor is the weight of the value-weighted NYSE/AMEX/Nasdaq composite index minus the risk free-rate.
2. The *HML* factor consists of the return on a zero-investment portfolio constructed by subtracting the returns of low book-to-market ratio stocks from the returns of high book-to-market ratio stocks.
3. The *SMB* factor consists of the return on a zero-investment portfolio constructed by subtracting the returns of large market capitalization stock returns of small market capitalization firms.
4. The *PR1YR* factor consists of the return on zero-investment portfolio as spread between the performance of stocks that are in the top 30% of return in the prior 12 months and those that are in the bottom 30%.

The data-set that I received from Chevalier and Ellison was a fairly complete Stata data file, instead of a raw data file. All yearly performance measures and all characteristic measures were previously computed and the backwards tracing to find the fund's name, the manager's name, or the manager's undergraduate school was not possible. Although the cost to compute these measures was saved, constraints are placed on any further investigation.

For example, the data does not have variables for monthly or yearly standard deviation for performance, or any variable for manager's identity. Therefore, the Sharpe ratio, or other ratio for the fund manager cannot be computed or used as performance measures. Panel methods cannot be used because of the lack of a variable for manager identification. Summary statistics for all variables are reported in Table 1.

Table 1: Summary Statistics

Variable	Name	Obs	Mean	Std. Dev.	Min	Max
year	Year	2963.00	91.89	2.14	88.00	95.00
exp	Expense	2500.00	1.32	0.98	0.00	15.13
turn	Turnover	2322.00	75.90	71.78	0.00	1193.00
ass	Asset Size	2822.00	495.85	1850.64	0.00	53805.00
sat	SAT	2963.00	1140.55	143.53	790.00	1420.00
alpha	CAPM Alpha	2957.00	-1.06	7.49	-65.34	46.71
unsys	Unsystematic Risk	2747.00	2.52E-04	3.34E-04	1.01E-06	4.93E-03
alphaf	4-factor Alpha	2747.00	-1.10	8.38	-65.38	50.21
rmrfc	CAPM Beta	2747.00	0.95	0.23	-0.22	2.21
hmlc	HMLC	2747.00	-0.03	0.42	-3.32	1.99
smbc	SMBC	2747.00	0.14	0.38	-1.22	2.15
pr1yrc	PR1YRC	2747.00	0.01	0.22	-1.56	1.28
sexret	Simple Excess Return	2957.00	-0.89	7.27	-54.13	65.58
gradyr	Graduation Year	2590.00	68.39	9.88	31.00	88.00
hasmba	MBA Dummy	2963.00	0.58	0.49	0.00	1.00
mgrten	Manager's Tenure	2961.00	4.01	5.15	0.00	37.00
gidum	Growth income Dummy	2963.00	0.37	0.48	0.00	1.00
manage	Manage's Age	2590.00	44.47	9.75	24.00	84.00
beat	Alpha Dummy	2957.00	0.43	0.50	0.00	1.00
beatf	Alphaf Dummy	2747.00	0.47	0.50	0.00	1.00

Note: All returns are before deduction of expense. Year is denominated as 88, 89, etc. Expense, turnover, alpha, alphaf, and sexret are annualized figures, and denominated in percentage. Unsys is variance of residual in regression of monthly returns (not in percentage) on market return. Asset size is in millions.

4. METHODOLOGY

Due to the size of the data-set and the limited number of variables for control, estimation methods are simple linear regression and probit estimation. Many papers use instrumental variables or 3-stage least squares regression, but such methods would be inaccurate without a clean instrumental variable. Commonly, the last year's expense ratio or net assets and turnover are used as IVs for the endogenous variables (expense and turnover ratio), but manager's ability and other missing fund characteristics can be correlated with these variables. For example, managers who believe that they can beat the market or have the ability to beat the market in the short-run would have higher expenses and turnover ratios than would passive managers or managers who have the ability to beat the market in the long-run. The belief and ability of a manager would not change dramatically over the career of the manager if an agent's behavior is usually consistent. Growth funds are designed to invest in aggressive growth stock and balanced income funds are designed to be less aggressive. Therefore, fund turnover rates can be correlated over time and lagged fund characteristics are not suitable for IV. In combination with the constraints on the data-set, keeping estimation methods simple can reduce the extra bias from complicated estimation.

Next, the way in which manager characteristics are related to fund performance is shown. The following relationship is estimated:

$$Performance_i = ManagerCharacteristic_i * \beta + T * \gamma + \varepsilon_i$$

Performance$_i$ is measured using simple excess return, CAPM Alpha, or 4 factor alpha. $ManagerCharacteristic_i$ is a vector of fund manager characteristic variables such as *age, tenure*, and *MBA* dummy. *T* is a year dummy and p-values for all tables are calculated using asymptotic statistics. In addition to the linear model described above, a Probit model is estimated for the probability of beating the market based on the following equation.

$$P(Beat = 1 \mid Managercharacteristic) = \Phi(ManagerCharacteristic_i * \beta + T * \gamma + \varepsilon_i)$$

where Φ is normal cumulative density function. *Beat* and *Beatf* are the binary dependent variables, where 0 indicates that the fund has negative alpha or alphaf, and 1 indicates otherwise. The results of all probit regressions are reported with the marginal probability instead of the coefficient.

Section 6 estimates the relationship between a fund's characteristics and its manager's characteristics.

$$FundCharacteristic_i = ManagerCharacteristic_i * \beta + T * \gamma + \varepsilon_i$$

Fund characteristic variables include asset size, expense, turnover ratio, beta, and unsystematic risk.

Section 7 estimates the complete relationship.

$$Performance_i = Allcharacteristic_i * \beta + T * \gamma + \varepsilon_i$$

$$P(Beat = 1 \mid Allcharacteristic) = \Phi(Allcharacteristic_i * \beta + T * \gamma + \varepsilon_i)$$

Different performance measures are regressed on all characteristic variables. When simple excess return is the dependent variable, beta and unsystematic risk are being dropped.

After viewing all possible scatter plots, a non-linear relationship appears to exist between age and fund performance. Figures 1 to 3 show the existence of a kink point around age 62 at all performance and age graphs, by using Loess Smoothing (local regression). As a result, most of the following estimations, related to these issues, will incorporate this kink. The Kink variable is created by allowing the marginal effect of the age to change at age 62. Because only 5% of managers are above 62, the kink variable is only used for capturing and controlling for this nonlinearity. The results do not focus on the kink coefficients.

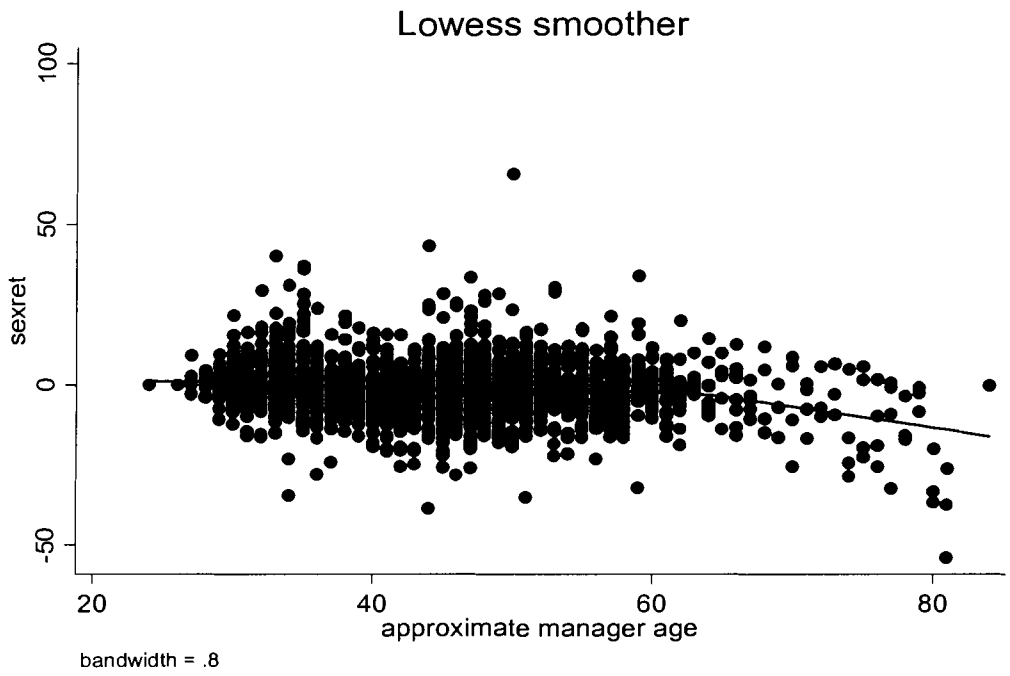

Figure 1: Simple Excess Return vs. Manager's Age

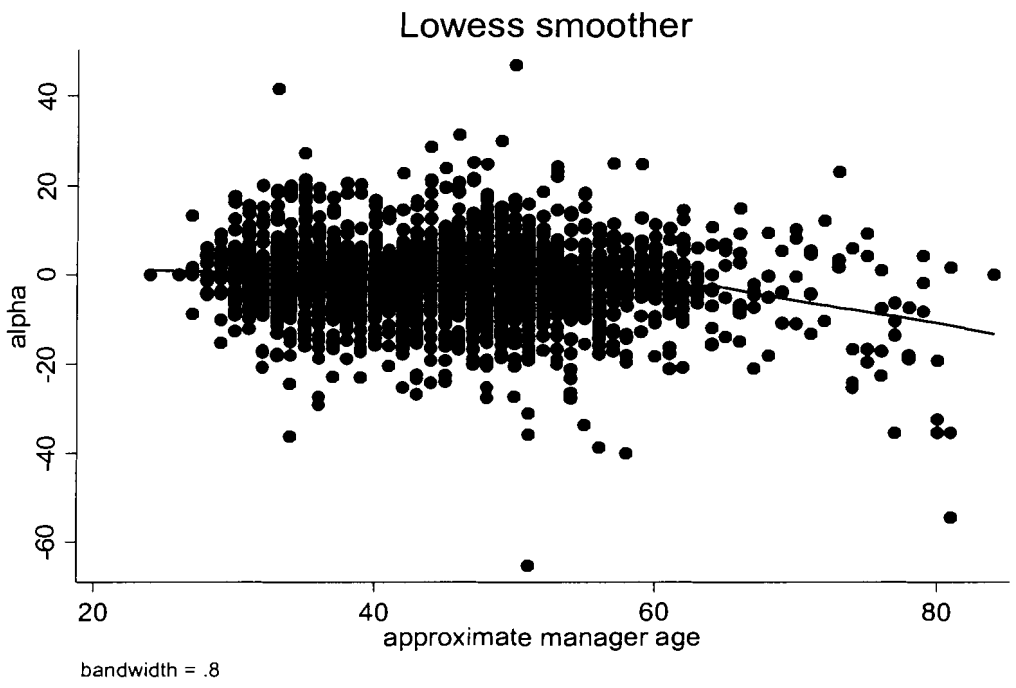

Figure 2: CAPM Alpha vs. Manager's Age

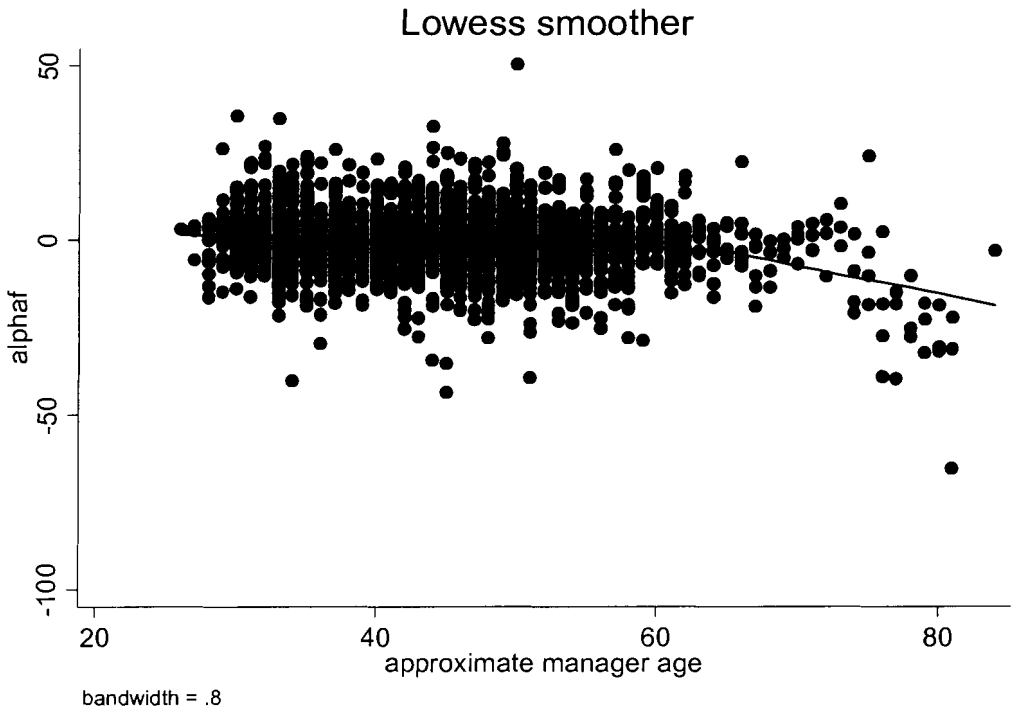

Figure 3: 4-factor Alpha vs. Manager's Age

5. PERFORMANCE VS. MANAGER CHARACTERISTICS

Throughout this paper, the performance of the fund in year t is matched with year t-1 manager characteristics, and models are estimated by OLS regression with cluster-corrected standard error to allow for correlation within the fund, across years. To address the criticism of Gottesman and Morey (2006), year dummies are included to every regression to control for the state of the market. The kink relationship in age is incorporated into the performance regression whenever the manager's age is an independent variable. The dependent variables (simple excess return, alpha, and alpha4) are regressed on all managers' characteristics variables. The results (Table 2) show that SAT and manager's age are both statistically significant in all possible cases. Managers from undergraduate institutions with higher average SAT values perform better than do other managers, in all performance measures. As predicted, older managers underperform younger managers by 4 to 6 basis points in all performance measures. Experience and having an MBA degree does not affect a manager's performance statistically. This can be explained by the idea that investment banks or mutual fund companies may provide enough specific training to their fund managers, or that managers from high-SAT schools have already demonstrated their superior ability, so that having an MBA degree and experience does not have a significant impact on a manager's performance.

For further investigation, this paper uses probit estimation to examine how a manager's characteristics affect the probability of beating the market. A 100 point increase in the SAT average for a manager's undergraduate school was found to be associated with an increased probability of beating the market by at least 1.85%. On average, a 10-year increase in age is associated with a 3.0% decrease in the probability of beating the market. Overall, the results are consistent across estimations.

Table 2: Fund Performance and Manager Characteristics

	Dependent Variables					
	Sexret		Reduced Sample		Alpha	
R-square	0.0957		0.122		0.107	
Independent Variables	Coef.	P>|t|	Coef.	P>|t|	Coef.	P>|t|
Manager's characteristics						
Gidum	-1.103	0.000	0.106	0.768	0.184	0.544
Sat	0.003	0.015	0.003	0.049	0.002	0.056
Hasmba	0.511	0.109	0.133	0.749	-0.117	0.710
Mgrten	0.002	0.950	0.061	0.160	0.038	0.289
Manage	-0.042	0.012	-0.045	0.034	-0.055	0.003
Kink	-0.678	0.002	-0.673	0.007	-0.572	0.026

	Dependent Variables					
	Reduced Sample		Alphaf		Reduced Sample	
R-square	0.146		0.970		0.119	
Independent Variables	Coef.	P>|t|	Coef.	P>|t|	Coef.	P>|t|
Manager's characteristics						
gidum	1.575	0.000	-0.851	0.017	0.019	0.962
Sat	0.002	0.170	0.004	0.020	0.003	0.045
hasmba	-0.170	0.703	0.440	0.235	0.359	0.407
mgrten	0.091	0.071	0.031	0.464	0.052	0.326
manage	-0.054	0.034	-0.062	0.003	-0.063	0.010
Kink	-0.573	0.030	-0.831	0.005	-0.855	0.004

Probit Estimation	Dependent Variables			
	Beat		Reduced Sample	
Pseudo R-square	0.0349		0.0559	
Independent Variables	dF/dx	P>|t|	dF/dx	P>|t|
Manager's characteristics				
gidum	0.032	0.148	0.116	0.000
Sat	0.000	0.003	0.000	0.007

hasmba	0.015	0.488	0.016	0.604
mgrten	0.004	0.069	0.006	0.046
manage	-0.003	0.018	-0.002	0.252
Kink	-0.007	0.395	-0.006	0.549

Probit Estimation	Dependent Variables			
	Beatf		Reduced Sample	
Pseudo R-square	0.0378		0.0471	
Independent Variables	dF/dx	P>|t|	dF/dx	P>|t|
Manager's characteristics				
Gidum	-0.033	0.113	0.017	0.555
Sat	0.000	0.016	0.000	0.041
hasmba	0.015	0.473	0.014	0.625
mgrten	-0.004	0.189	-0.003	0.392
manage	-0.003	0.014	-0.003	0.068
Kink	-0.012	0.158	-0.006	0.549

6. FUND CHARACTERISTICS VS. MANAGER CHARACTERISTICS

The risk-taking and trading behavior of managers may depend on their preferences and characteristics and this section investigates whether or not a manager's characteristics have any systematic relationship with fund characteristics. Systematic risk (*Beta* or *RMRF*) and unsystematic risk (unsys) is taken from CAPM. Betas are calculated from regressing the fund's monthly excess returns on monthly market excess return (12 month horizon). Because the average turnover rate is 75%, a 12-month horizon is appropriate. *Unsys* is the square root of the estimated residual variance of CAPM. In Table 3, managers who have an MBA degree are shown to take on more systematic risk than others. Older managers take on more unsystematic risk than do younger managers, a finding which is consistent with Chevalier and Ellison (1999). Since older agents have less future income stream, they would take on less risk than younger agents. Nevertheless, the effect of less punishment on older managers predominates. Managers who are 10 years older than the average would take on 14% more unsystematic risk. Older managers underperform relative to younger managers.

Table 3: Fund Characteristics and Manager Characteristics

	Dependent Variable					
	Ass		Reduced Sample		Exp	
R-square	0.0321		0.0310		0.0012	
Independent Variables	Coef.	P>|t|	Coef.	P>|t|	Coef.	P>|t|
Manager's characteristics						
gidum	97.039	0.520	40.494	0.843	-0.095	0.374
Sat	0.626	0.225	1.049	0.217	-0.001	0.108
hasmba	278.362	0.044	345.197	0.041	-0.114	0.149
mgrten	47.264	0.072	60.192	0.043	0.011	0.587
manage	-17.770	0.061	-24.092	0.068	0.026	0.010

	Dependent Variable					
	Reduced Sample		Turn		Reduced	
R-square	0.0838		0.0207		0.0207	
Independent Variables	Coef.	P>|t|	Coef.	P>|t|	Coef.	P>|t|
Manager's characteristics						
gidum	-0.112	0.304	-14.806	0.024	-13.90	0.056
Sat	0.000	0.189	-0.040	0.106	-0.026	0.261
hasmba	-0.105	0.188	-4.000	0.498	-4.345	0.484
mgrten	0.015	0.491	-0.565	0.402	-1.023	0.153
manage	0.022	0.014	-0.150	0.720	-0.356	0.411

	Dependent Variable			
	Rmrf		Reduced Sample	
R-square	0.0349		0.0209	
Independent Variables	Coef.	P>|t|	Coef.	P>|t|
Manager's characteristics				
gidum	-0.040	0.006	-0.020	0.182
Sat	0.000	0.142	0.000	0.154
hasmba	0.047	0.002	0.038	0.014
mgrten	-0.003	0.161	-0.001	0.502
manage	0.001	0.247	0.001	0.089

	Dependent Variable			
	Unsys		Reduced Sample	
R-square	0.100		0.112	
Independent Variables	Coef.	P>|t|	Coef.	P>|t|
Manager's characteristics				
gidum	-1.52E-04	0.000	-1.69E-04	0.000
Sat	-9.67E-08	0.210	-9.26E-08	0.287
Hasmba	1.50E-07	0.995	3.49E-06	0.885
Mgrten	4.56E-06	0.156	6.26E-06	0.108
Manage	3.76E-06	0.028	3.56E-06	0.041

Only the manager's having an MBA degree has a significant relationship with asset size. Managers with MBA degrees are more likely to be in charge of larger funds. Top management may have more faith in managers with MBA degrees because of their advertising advantage in attracting money into the fund or higher ability to achieve better performance. Almost none of the managers' characteristics have significant association with expense or turnover ratios. One exception is that younger managers charge lower expenses, representing their superior ability, in combination with the results shown in Section 8. Consistent with the work of Chevalier and Ellison (1999), younger managers have an incentive to charge higher expenses because they are reluctant to turn investors away from their fund. A fund's asset size and performance is one of the key elements for the survival of a mutual fund, given that the managers can easily be punished.

7. COMPLETE RELATIONSHIP

This section studies performance and the relationship of all characteristics, as a whole. Expense, asset size, risk and turnover reflect the amount and cost of research, trade, and advertising. Therefore, fund characteristics should also be included in explaining a fund's performance. Table 4 shows different performance measures regressed on all of the fund and manager characteristics. The SAT variable has a significant and positive relationship with performance (measured by simple excess return and alphaf), while the manager's age and the fund's expense ratio have significantly negative relationships with all performance measures. Each 100 point increase in SAT values is associated with an increase in performance of 0.3% and an increase in the probability of beating the market of at least 2.4% point.

Table 4: Fund Performance and All Characteristics

	Dependent Variables					
	Sexret		Reduced Sample		Alpha	
R-square	0.0947		0.120		0.1228	
Independent variable	Coef.	P>|t|	Coef.	P>|t|	Coef.	P>|t|
Manager's characteristics						
gidum	-1.558	0.000	-0.296	0.497	-0.520	0.093
sat	0.003	0.013	0.003	0.101	0.003	0.031
hasmba	0.572	0.075	0.065	0.889	-0.187	0.577
mgrten	-0.022	0.447	0.057	0.177	0.027	0.381
manage	-0.033	0.050	-0.046	0.075	-0.052	0.007
kink	-0.063	0.545	0.058	0.655	0.049	0.730
Fund's characteristic						
ass	0.000	0.015	0.000	0.014	0.000	0.474
exp	-1.353	0.000	-1.558	0.000	-1.417	0.000

turn	0.005	0.147	0.004	0.288	0.002	0.574
rmrfc	N/A	N/A	N/A	N/A	-3.270	0.000
unsys	N/A	N/A	N/A	N/A	1337.591	0.317

	Dependent Variables					
	Reduced Sample		Alphaf		Reduced Sample	
R-square	0.196		0.151		0.263	
Independent Variables	Coef.	P>|t|	Coef.	P>|t|	Coef.	P>|t|
Manager's characteristics						
gidum	0.669	0.160	-1.201	0.000	-0.148	0.701
sat	0.002	0.148	0.003	0.025	0.003	0.061
hasmba	-0.324	0.524	0.299	0.416	0.137	0.732
mgrten	0.106	0.037	-0.005	0.894	-0.001	0.979
manage	-0.056	0.056	-0.042	0.047	-0.039	0.092
kink	0.151	0.372	-0.107	0.482	-0.022	0.893
Fund's characteristics						
ass	0.000	0.408	0.000	0.310	0.000	0.202
exp	-1.757	0.000	-1.689	0.000	-1.933	0.000
turn	0.002	0.673	0.001	0.876	-0.004	0.300
rmrfc	-5.756	0.000	-7.138	0.000	-9.869	0.000
unsys	1491.943	0.415	1831.327	0.169	-620.856	0.628

Probit Estimation	Dependent Variables			
	Beat		Reduced Sample	
Pesudo R-square	0.0549		0.0957	
Independent Variables	dF/dx	P>|t|	dF/dx	P>|t|
Manager's characteristics				
gidum	0.003	0.906	0.068	0.062
sat	2.63E-04	0.002	3.19E-04	0.008
hasmba	0.002	0.926	0.003	0.932
mgrten	0.003	0.272	0.005	0.203
manage	-0.003	0.019	-0.003	0.231
kink	0.020	0.008	0.030	0.017
Fund's characteristics				
ass	0.000	0.951	0.000	0.990
exp	-0.098	0.000	-0.141	0.000
turn	0.000	0.569	0.000	0.733
rmrfc	-0.125	0.024	-0.245	0.001
unsys	98.655	0.028	101.630	0.063

	Dependent Variables			
	Beatf		Reduced Sample	
Pseudo R-square	0.0644		0.120	
Independent Variables	dF/dx	P>|t|	dF/dx	P>|t|
Manager's characteristics				
gidum	-0.039	0.094	0.021	0.533
sat	2.44E-04	0.002	2.89E-04	0.007
hasmba	0.015	0.513	-0.002	0.950
mgrten	0.001	0.643	0.001	0.796
manage	-0.003	0.021	-0.004	0.070

kink	0.005	0.470	0.017	0.121
Fund's characteristics				
ass	0.000	0.944	0.000	0.744
exp	-0.067	0.001	-0.139	0.000
turn	0.000	0.795	0.000	0.371
rmrfc	-0.381	0.000	-0.577	0.000
unsys	159.941	0.000	108.123	0.015

The most interesting result is that a fund's expense ratio does not provide any extra benefit to investors, but deteriorates the performance by a sizeable percentage. Each percentage point increase in expense is associated with a decrease in each performance measure, by at least 1.35%. From the probit estimations, 1% increase in the expense ratio is associated with a decrease in the probability of beating the market of at least 6.7% point. This can be explained by the higher expense funds allocating these expenses into their marketing and advertising cost instead of into research for stock-picking. This idea is consistent with the work of Barber, Odean and Zheng (2005), who found that the costs of marketing and advertising are embedded in a fund's operating expense.

Fund's beta is negative and significant from all estimations. An increase in beta by 0.1 unit is associated with a decrease in each performance measure, by at least by 0.32%. From probit estimations, 0.1 unit increase in the fund's beta is associated with a decrease in the probability of beating the market of at least 1.2% point. From the results presented in this section, investors should invest in funds with low expenses and beta and with managers from schools with high average SAT.

8. SURVIVORSHIP BIAS

Carhart, Carpenter, Lynch, and Musto (2002) demonstrated that survivorship bias increases measured fund performance by 0.07% for a 1-year sample and by 1% for a 15-year sample. Since even 0.01% can have a large effect in financial research, most articles in the literature use either the CRSP survivorship-bias free data or a Heckman selection model for dealing with survivorship bias. In the Heckman Selection Model, one assumption is that the set of explanatory variables for performance should be a proper subset of the explanatory variables of survival. As a result, the Heckman Correction Method is not appropriate in this case. Moreover, without variables such as manager's name, for recognizing job change or retirement, the Heckman model cannot be used in this analysis.

To reduce survivorship bias, in this study, all regressions were re-estimated with the observations before year 1992 was dropped. This results in approximately 40% of the observations being dropped. The main reason for this is that observations before year 1992 are relatively incomplete. The reduced survivorship bias sample estimation (from Table 2 and 4) shows that the SAT and age coefficients become barely insignificant in most cases, but SAT remains to be a statistically significant factor for beating the market. Although the reduced survivorship bias and the reduced size of the sample reduce the magnitude and

the significance of these coefficients, the sign of the coefficients does not change. In particular, the coefficients for expense remain strongly significant.

9. CONCLUSION AND IMPLICATIONS

Overall, the evidence suggests that younger managers with higher ability, who receive their undergraduate degrees from institutions with high average SAT values, outperform other managers. This is consistent with the Chevalier and Ellison (1999) result. Higher expense funds that are usually run by older managers do not provide any extra benefit in research or stock-picking ability. Investors may be making mistakes by investing in larger funds that are run by older and more experienced managers, even though they tend to underperform other managers, statistically. Therefore, investors should avoid any mutual funds that charge high expenses and beta or are run by older managers, who are from low-SAT average schools. Such funds have a lower probability of beating the market after risk-adjustment.

Because the relevant data is proprietary, this study did not have access to information on any fund manager's GRE average for their other graduate degrees or GMAT averages for MBA degrees. This may explain why the MBA degree does not have impact on most of the explained variables. Since the quality of MBA programs varies widely across schools, managers from good (high-GMAT) and weak (low-GMAT) MBA programs are mixed into the *MBA* dummy, to make it insignificant in most estimations. Other variables that affect fund performance, such as number of outside and inside board directors, different types of exotic expenses (front-end load and back-end load with time

limit), and manager's past positions, should be included in the model, but are not available in the data.

Perhaps regulatory organizations should order mutual funds to disclose more of the data on the characteristics of their funds and their managers. Investors would thus be able to have an equal opportunity as insiders to make decisions about their investment. In addition, a greater transparency would allow different disciplines to study the performance and behaviors of the financial market to promote market efficiency and to provide a better understanding for investors.

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