EVALUATION OF SIZE AND BOOK-TO-MARKET FACTORS IN HEALTH RELATED MUTUAL FUNDS

S. P. Uma Rao, University of Louisiana at Lafayette
Denis Boudreaux, University of Louisiana at Lafayette

ABSTRACT

Fama and French proposed a three factor model to better measure returns. Their model has become a standard tool for empirical studies of asset and portfolio returns. Fama and French add firm size and a book-to-market ratio to the market index to explain average returns. These additional factors are motivated by the observations that average returns on stocks of small firms and on stocks of firms with a high ratio of book value of equity to market value of equity have historically been higher than predicted by the security market line of the Capital Asset Pricing Model. The Fama/French model is utilized in this study for evaluating the health care mutual funds.

INTRODUCTION

Fama and French (1992) find that two factors, market equity (ME), a size based factor and the ratio of book equity to market equity (BE/ME), often called a "value" factor capture much of the cross section of average stock returns. They also find that the main prediction of the Capital Asset Pricing Model (CAPM), a linear cross-sectional relationship between mean excess returns and exposures to the market factor, is violated for the US stock market. Fama and French in (1993) and later in (1996) proposed a three-factor model that has become a standard tool for empirical studies of asset returns. Fama and French add firm size and book equity-to-market equity ratio to the market index to explain average returns. These additional factors are motivated by the observations that average returns on stocks of small firms and on stocks of firms with a high ratio of book value of equity to market value of equity have historically been higher than predicted by the security market line of the CAPM. This observation suggests that size or book-to-market ratio may be proxies for exposures to sources of systematic risk not captured by the CAPM beta, and thus results in return premiums. For example, Fama and French point out those firms with high ratios of book to market value are more likely to be in financial distress and that small stocks may be more sensitive to changes in business conditions. Thus these variables may capture sensitivity to macroeconomic risk factors.

Indexes such as the S&P 500 or Wilshire 5000 are often used to evaluate the performances of active money managers. Given the Fama/French findings, the use of such benchmarks is often misleading. Because these indexes are weighted heavily towards large company stocks and high priced stocks, the performances of managers investing more heavily in small company stocks or low priced stocks won't be

accurately measured by them. Instead, customized benchmarks are needed to provide accurate measurements of the contributions to performances made by active money managers.

The seminal work of Fama and French (1992), initiated the death of beta, as well as the competition between the rational school and the behavioral school (Fama and French (1998) and Davis, Fama and French (2000)). Cross-sectional regularities such as size and Book-to-Market have been perceived as asset-pricing anomalies that are inconsistent with the mainstream theories. Hawanini and Keim (2000) provide a nice survey on the cross-section of stock returns, and claim that many anomalies appear to be only significant during the month of January. Hence, they cast doubt on the risk-based explanation because it appears to be implausible that the markets are systematically riskier only in January (Also see Bernstein (2002), Knez and Ready (1997), Fama and French (1998), and Schwert (2002)). In contrast, based on extensive psychological findings on the non-rational aspects of human beings, behavioral finance theories view these anomalies as a result of investors' irrationality. Schwert (2002) points out that anomalies such as size effect, the value effect, the weekend effect and the dividend yield effect seem to have weakened or simply disappeared after the papers that highlighted them were published. Chou, Chou and Wang (2004) examine the role of size and book-to-market in the cross-section of expected stock returns and find that size effect becomes insignificant during the post-1981 period, and BM effect becomes insignificant during the post 1990 period. The results appear to echo Schwert's (2002) assertion that research findings make the markets more efficient.

The Fama/French Three-Factor Model is a superior way to evaluate the performances of active money managers. It shows more than if a funds manager achieves returns in excess of index returns. After all, an active manager shouldn't be rewarded just for buying value stocks—that's something that can be done inexpensively with an indexing strategy. Fama/French three factor model is utilized in this study for evaluating Morning Star Database mutual funds in the health care area for the period 2000-2006. We analyze whether the market, size and value factors are pervasive in the cross-section of random stock returns.

THE MODEL WITH MARKET, SIZE, AND BE/ME FACTORS IN MUTUAL FUND RETURNS

CAPM uses a single factor, beta, to compare a portfolio with the market as a whole. Gene Fama and Ken French started with the observation that two classes of stocks have tended to do better than the market as a whole: (i) small caps and (ii) stocks with a high BE/ME ratio (customarily called "value" stocks; their opposites are called "growth" stocks). They then added two factors to CAPM to reflect a portfolio's exposure to these two classes, as in equation (1):

$$r - R_f = beta_3 \times (K_m - R_f) + b_s \times SMB + b_v \times HML + alpha \qquad (1)$$

Here r is the mutual fund portfolio's return rate, R_f is the risk-free return rate, and K_m is the return of the whole stock market. The "three factor" beta is analogous to the classical beta but not equal to it, since there are now two additional factors to do some of the work. SMB and HML stand for "small [cap] minus big" and "high

[BE/ME] minus low"; they measure the historic excess returns of small caps and "value" stocks over the market as a whole. By the way SMB and HML are defined, the corresponding coefficients b_s and b_v take values on a scale of roughly 0 to 1: b_s = 1 would be a small cap portfolio, b_s = 0 would be large cap, b_v = 1 would be a portfolio with a high BE/ME ratio, etc.

One thing that's interesting is that Fama and French still see high returns as a reward for taking on high risk; in particular that means that if returns increase with BE/ME, then stocks with a high BE/ME ratio must be more risky than average - exactly the opposite of what a traditional business analyst would tell you. The difference comes from whether you believe in the efficient market theory (EMT). The business analyst doesn't believe it, so he would say high BE/ME indicates a buying opportunity: the stock looks cheap. But if you do believe in EMT then you believe cheap stocks can only be cheap for a good reason, namely that investors think they're risky...

Fama and French aren't particular about why BE/ME measures risk, although they and others (see Liew and Vassalou (2000), Petkova and Zhang (2005)) have suggested some possible reasons. For example, high BE/ME could mean a stock is "distressed", temporarily selling low because future earnings look doubtful. Or, it could mean a stock is capital intensive, making it generally more vulnerable to low earnings during slow economic times. Those both sound plausible; but they seem to be describing completely different situations (and what happens when a company that isn't capital intensive becomes "distressed"?) It may be that the success of this model at explaining past performance isn't due to the significance of any of the three factors taken separately, but in their being different enough that taken together they do an effective job of "spanning the dimensions" of the market[1].

Portfolio Analysis

Like CAPM, the Fama and French model is used to explain the performance of portfolios via linear regression; only now the two extra factors give you two additional axes, so instead of a simple line the regression is a graphic in the fourth dimension. Even though you can't visualize this regression, you can still solve for its coefficients in a spreadsheet. The result is typically a better fit to the data points than you get with CAPM.

DATA

The study employs the 2006 Morningstar mutual fund database to identify Specialty: Health mutual funds. The analysis focuses on the subset of Health mutual funds that satisfied the following criteria: (1) classified by the Morningstar as a Health fund and (2) return history of at least six and half years of quarterly returns. A longer study period is more meaningful for deciphering the performance of mutual funds. Unfortunately, it was impossible to expand the study period prior to 2000 because of data availability. The study period is from first Quarter of the year 2000 through second Quarter of the year 2006. The sample of 68 mutual funds has a good representation of the industry accounting for a total of $44, 420.32 millions of assets and this study applies the Fama-French three-factor model to measure abnormal performance. The three-factor model is more comprehensive and capable of revealing factors that influence Health mutual fund performance.

Table 1 reports summary statistics. During the study period of Quarter 01/2000- Quarter 02/2006, the 68 sample funds on an average generated a 1.3366% quarterly return. The returns were volatile over this time period, evident by the quarterly standard deviation of 2.5023%. As of Quarter 02/2006, the average Health mutual fund held $653.24 million in total assets. The average fund expense ratio was 1.75% and the average fund age was 120.96 months, a little over ten years.

Because quarterly Morningstar files do not go back prior to 2000, the need to rely upon the 2006 file creates a survivorship bias. Although the size of the bias is unknown, it is positive because funds with poor performance records tend to fail. In the presence of survivorship bias the intercept (alpha) estimates of current study are inflated upwards by the absence of terminated funds and the conclusion that Health mutual funds operate in a competitive environment is even more robust.

TABLE 1
SUMMARY CHARACTERISTICS OF 68 HEALTH MUTUAL FUNDS
QUARTER 01/2000- QUARTER 02/2006

Characteristics	Average
Average Quarterly Return %	1.3366
Average Quarterly Standard Deviation %	2.5023
Turnover ratio (percent)	93.96
Months since inception to Aug 31, 2006	120.96
Total assets ($MM)	653.24
Net assets ($MM)	288.51
Market Capitalization ($MM)	18975.50
Expense ratio %	1.75
Front Load (19 mutual funds out of 68 have front load) %	5.16
Deferred Load (27 out of 68 have deferred load) %	2.89
12b-1 fee (48 out of 68 mutual funds have 12b-1) %	0.68

RESULTS

Interpreting Regression Coefficients and p-values For IAGHX Mutual Fund

The regressions of excess return on mutual fund as dependent variable and excess return on the market portfolio of stocks (Rm – Rf), SMB and HML as independent variables, for quarterly returns of Quarter 1 of the year 2000 through

Quarter 2 of the year 2006 for 68 Health mutual funds are presented in Table 2. Any independent variable-excess return on the market, Rm-Rf or SMB or HML- with a p-value less than or equal to .05 is considered to be useful for predicting the dependent variable, the excess quarterly return on the mutual fund. The smaller is the p-value, the higher the predictive power of the independent variable. Regression coefficients, standard error, t-stats, and p-values are provided in the table below. The R-square is 46.85%.

TABLE 2
Regression Coefficients and p-values For IAGHX Mutual Fund

	Coefficients	Standard Error	t Stat	P-value
Intercept	0.835961	2.069585	0.403927	0.690166
Rm-Rf	0.837667	0.227145	3.687807	0.001287
SMB	-0.2837	0.335523	-0.84556	0.406904
HML	-0.3141	0.244975	-1.28216	0.213132
R-square	46.85%			

The three factor model is cited in equation (2):

Average Excess return on IAGHX = 0.835961 + 0.837667 (Rm-Rf) – 0.2837 SMB – 0.3141 HML + Random error (2)

First, the intercept is the fund's alpha, 0.835961 per quarter or about 3.34% per year. In other words, the managers, after expenses, outperformed the regression-based benchmark by that amount. However, the t-stat and p-value tell us that this is not statistically significant.

Next, we have the "loadings" for the three factors. The Market loading is 0.837667. This is the traditional beta of the fund. Most equity-only funds have values very close to 1.0. The SmB loading is -.2837. This means that the fund is primarily large cap. (A zero value signifies large cap, and a value of greater than 0.5, small cap).

Finally, the HmL loading is -.3141, which tells us that we're looking at a growth fund. (A zero value defines a growth portfolio, a value of more than 0.3, a value fund.)

Our three independent variables have p-values of 0.001287 (for Rm-Rf), 0.406904 (for SMB), and 0.213132 (for HML). These p-values may be interpreted as follows:

When we use SMB and HML to predict excess return on mutual fund, we have a 99.8713 percent chance (1- 0.001287) that Rm-Rf adds predictive power.

When we use (Rm-Rf) and HML to predict excess return on mutual fund, there is a 59.3096 percent chance (1 – 0.406904) that SMB adds predictive power.

When we use (Rm-Rf) and SMB to predict excess return on mutual fund, there is a 78.6868 percent chance (1 – 0.213132) that HML adds predictive power.

When excess return on the market is used to predict excess return on the

mutual fund our p-values indicate that SMB and HML do not add much predictive power to predict the dependent variable.

The results are tabulated in table 3. It is important to highlight that the ability of the Fama-French model to describe Health fund returns is rather low; the three factors accounted for an average 51.81% of portfolio's behavior. The low R-square could be due to drifts in style, or possible holdings of fixed income and foreign investment concentrated positions or poor diversification. The empirical evidence is generally supportive of the Fama and French model. All three Fama-French factors, market, size, and value, have a pervasive influence on random returns in the Health care mutual funds. The results indicate that Health related mutual funds do provide positive abnormal performance on average of 1.62186361% per quarter during the period Q1/2000 through Q2/2006, but it is not significant in any mutual fund. Mutual Fund performance to a large extent is determined, not surprisingly, by the excess return on the market portfolio (Rm – Rf) of stocks and in 67 out of 68 mutual funds, (Rm-Rf) variable is significant at 0.01 level. In fourteen mutual funds SMB beta and in nine mutual funds HML beta are significant and negative. In other words, fourteen of sixty-eight mutual funds have meaningful exposure to large capitalization and nine of sixty-eight to growth. In four mutual funds, both SMB and HML betas are significant and negative, meaning that these four have exposure to large growth mutual funds. Investment managers in this sector seem to produce positive abnormal returns because of their specific appraisal skills and information. Nevertheless, existing studies on professionally managed mutual funds have not found evidence of positive abnormal performance. It is important to note that market premium, size premium and value premium do not show up like clockwork. If they did, they would not be risk factors. For instance, from 1995-2000, market premium was huge while small size and value premiums were negative[2]. Since 2000, market premium has been negative while small size and value premiums are large. Another important point to consider is that size and value risks are different than the market risk, but don't necessarily add total risk to the portfolio-at lease as measured by standard deviation. So a portfolio tilted away from the center of the market will act differently from the market, but will not necessarily have more risk.

This paper offers two central findings in support of Fama-French three-factor asset-pricing model. One, size effect and book-to-market effect seem to have weakened after the papers that highlighted them were published. These results are in support of those of Schwert (2002) and cause the market to be more efficient. Two, the linear exposures of these mutual fund returns to three factors explain nearly 52% of the cross-sectional dispersion of their mean returns. There are numerous questions left unanswered by our study. Are the size and value factors pervasive in explaining the risk of a wider range of portfolios (such as industry-sorted portfolios)? Is there evidence for any other pervasive factors in returns? Can the random returns on these equity return factors be related to corporate earnings shocks or other business cycle variables? Are our findings on a significant (positive) size premium and significant (positive) growth premium robust to alternative samples and different estimation methods? Health care mutual fund industry is a very large market with a growing and fast maturing equity market. A better understanding of the risk and return characteristics of this market is an important research problem.

TABLE 3
REGRESSION STATISTICS (DEPENDENT VARIABLE: EXCESS QUARTERLY RETURN ON MUTUAL FUND - INDEPENDENT VARIABLES: RM-RF, SMB, HML FACTORS OF FAMA AND FRENCH)

	MF		***Intercept***	***Rm-Rf***	***SMB***	***HML***	***R Square***	***Adjusted R Square***
1	IAGHX	*Coefficients*	0.836	0.838	-0.284	-0.314	0.468	0.396
		t Stat	0.404	3.688	-0.846	-1.282		
		P-value	0.690	0.001	0.407	0.213		
2	GGHCX	*Coefficients*	-0.682	0.509	0.068	0.163	0.410	0.329
		t Stat	-0.432	2.942	0.265	0.874		
		P-value	0.670	0.008	0.793	0.391		
3	GTHBX	*Coefficients*	-0.828	0.508	0.068	0.164	0.409	0.328
		t Stat	-0.525	2.934	0.265	0.880		
		P-value	0.605	0.008	0.793	0.388		
4	GTHCX	*Coefficients*	-0.823	0.508	0.068	0.163	0.409	0.329
		t Stat	-0.523	2.940	0.265	0.877		
		P-value	0.606	0.008	0.794	0.390		
5	AHLAX	*Coefficients*	0.644	0.731	**-0.468***	-0.155	0.588	0.532
		t Stat	0.514	5.319	-2.306	-1.044		
		P-value	0.612	0.000	0.031	0.308		
6	AHLDX	*Coefficients*	0.743	0.731	**-0.469***	-0.149	0.574	0.516
		t Stat	0.578	5.178	-2.250	-0.980		
		P-value	0.569	0.000	0.035	0.338		
7	AHLBX	*Coefficients*	0.450	0.730	**-0.466***	-0.154	0.589	0.533
		t Stat	0.360	5.330	-2.305	-1.039		
		P-value	0.722	0.000	0.031	0.310		
8	AHLCX	*Coefficients*	0.449	0.731	**-0.466***	-0.153	0.589	0.533
		t Stat	0.360	5.328	-2.298	-1.035		
		P-value	0.723	0.000	0.031	0.312		
9	DRBNX	*Coefficients*	2.707	1.297	0.038	-0.668	0.500	0.432
		t Stat	0.756	3.302	0.065	-1.577		
		P-value	0.458	0.003	0.949	0.129		
10	DGHCX	*Coefficients*	2.043	0.904	-0.215	-0.375	0.481	0.411
		t Stat	0.897	3.616	-0.583	-1.389		
		P-value	0.379	0.002	0.566	0.179		
11	SHSAX	*Coefficients*	2.348	1.047	-0.016	0.114	0.635	0.585
		t Stat	1.222	4.965	-0.050	0.501		
		P-value	0.235	0.000	0.960	0.621		
12	SCHLX	*Coefficients*	2.210	0.814	-0.255	-0.400	0.521	0.455
		t Stat	1.165	3.909	-0.828	-1.779		
		P-value	0.256	0.001	0.417	0.089		
13	ETHSX	*Coefficients*	2.557	0.880	-0.146	-0.436	0.496	0.427
		t Stat	1.128	3.538	-0.396	-1.624		
		P-value	0.272	0.002	0.696	0.119		
14	EMHSX	*Coefficients*	2.380	0.877	-0.146	-0.441	0.496	0.427
		t Stat	1.051	3.526	-0.396	-1.644		
		P-value	0.305	0.002	0.696	0.114		

TABLE 3
(CONTINUED): REGRESSION STATISTICS (DEPENDENT VARIABLE: EXCESS QUARTERLY RETURN ON MUTUAL FUND - INDEPENDENT VARIABLES: RM-RF, SMB, HML FACTORS OF FAMA AND FRENCH)

	MF		***Intercept***	***Rm-Rf***	***SMB***	***HML***	***R Square***	***Adjusted R Square***
15	ECHSX	*Coefficients*	2.374	0.880	-0.147	-0.437	0.497	0.428
		t Stat	1.048	3.541	-0.399	-1.628		
		P-value	0.306	0.002	0.694	0.118		
16	EHABX	*Coefficients*	5.249	0.922	0.084	-0.662	0.494	0.425
		t Stat	1.868	2.989	0.185	-1.991		
		P-value	0.075	0.007	0.855	0.059		
17	EHCBX	*Coefficients*	5.053	0.921	0.084	-0.659	0.494	0.425
		t Stat	1.802	2.993	0.184	-1.987		
		P-value	0.085	0.007	0.855	0.060		
18	EHCCX	*Coefficients*	5.059	0.921	0.083	-0.661	0.494	0.425
		t Stat	1.805	2.992	0.183	-1.993		
		P-value	0.085	0.007	0.857	0.059		
19	EHCYX	*Coefficients*	5.318	0.922	0.082	-0.661	0.494	0.425
		t Stat	1.895	2.995	0.181	-1.991		
		P-value	0.071	0.007	0.858	0.059		
20	FACDX	*Coefficients*	0.685	0.678	**-0.562***	-0.071	0.446	0.370
		t Stat	0.462	4.167	-2.338	-0.406		
		P-value	0.649	0.000	0.029	0.689		
21	FAHTX	*Coefficients*	0.494	0.678	**-0.563***	-0.070	0.447	0.372
		t Stat	0.334	4.180	-2.350	-0.402		
		P-value	0.741	0.000	0.028	0.692		
22	FHCCX	*Coefficients*	0.511	0.677	**-0.563***	-0.072	0.446	0.370
		t Stat	0.345	4.167	-2.346	-0.409		
		P-value	0.733	0.000	0.028	0.687		
23	FHCIX	*Coefficients*	0.783	0.681	**-0.566***	-0.071	0.447	0.372
		t Stat	0.527	4.178	-2.349	-0.407		
		P-value	0.603	0.000	0.028	0.688		
24	FACTX	*Coefficients*	0.625	0.677	**-0.563***	-0.072	0.444	0.368
		t Stat	0.421	4.153	-2.336	-0.410		
		P-value	0.678	0.000	0.029	0.686		
25	FBIOX	*Coefficients*	1.517	1.249	-0.225	-0.560	0.591	0.536
		t Stat	0.583	4.376	-0.534	-1.818		
		P-value	0.566	0.000	0.598	0.083		
26	FSPHX	*Coefficients*	0.773	0.681	**-0.570***	-0.068	0.441	0.365
		t Stat	0.515	4.130	-2.340	-0.384		
		P-value	0.612	0.000	0.029	0.704		
27	FSHCX	*Coefficients*	2.964	0.329	-0.329	0.144	0.053	-0.076
		t Stat	1.010	1.022	-0.691	0.416		
		P-value	0.323	0.318	0.497	0.682		
28	FSMEX	*Coefficients*	1.868	0.566	-0.170	-0.138	0.459	0.386
		t Stat	1.342	3.703	-0.751	-0.837		
		P-value	0.193	0.001	0.460	0.412		

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	MF		*Intercept*	*Rm-Rf*	*SMB*	*HML*	*R Square*	*Adjusted R Square*
29	FBDIX	*Coefficients*	2.630	1.293	0.150	**-0.911***	0.669	0.624
		t Stat	0.956	4.283	0.336	-2.796		
		P-value	0.349	0.000	0.740	0.011		
30	FKGHX	*Coefficients*	1.358	0.926	-0.197	-0.246	0.540	0.478
		t Stat	0.676	4.199	-0.606	-1.036		
		P-value	0.506	0.000	0.551	0.312		
31	FGHBX	*Coefficients*	1.166	0.924	-0.197	-0.247	0.541	0.478
		t Stat	0.582	4.201	-0.607	-1.040		
		P-value	0.567	0.000	0.550	0.310		
32	FGIIX	*Coefficients*	1.158	0.925	-0.197	-0.245	0.541	0.478
		t Stat	0.578	4.203	-0.605	-1.033		
		P-value	0.569	0.000	0.552	0.313		
33	GENEX	*Coefficients*	2.036	1.792	-0.220	-0.691	0.553	0.489
		t Stat	0.469	4.020	-0.334	-1.246		
		P-value	0.644	0.001	0.742	0.227		
34	ICHCX	*Coefficients*	0.396	0.556	0.046	0.115	0.513	0.446
		t Stat	0.290	3.714	0.209	0.713		
		P-value	0.774	0.001	0.836	0.483		
35	JGLIX	*Coefficients*	1.176	0.866	-0.177	**-0.557***	0.722	0.683
		t Stat	0.783	5.611	-0.775	-2.898		
		P-value	0.442	0.000	0.447	0.009		
36	JAGLX	*Coefficients*	1.628	0.880	-0.289	**-0.536***	0.705	0.665
		t Stat	1.133	5.581	-1.241	-3.152		
		P-value	0.269	0.000	0.228	0.005		
37	PHLAX	*Coefficients*	3.565	0.868	-0.222	-0.236	0.457	0.383
		t Stat	1.624	3.604	-0.624	-0.909		
		P-value	0.119	0.002	0.539	0.373		
38	PHLBX	*Coefficients*	3.354	0.868	-0.219	-0.233	0.457	0.383
		t Stat	1.529	3.603	-0.617	-0.897		
		P-value	0.141	0.002	0.544	0.380		
39	PHLCX	*Coefficients*	3.353	0.868	-0.220	-0.233	0.457	0.383
		t Stat	1.530	3.606	-0.619	-0.897		
		P-value	0.140	0.002	0.542	0.379		
40	PHSZX	*Coefficients*	3.633	0.869	-0.223	-0.234	0.457	0.383
		t Stat	1.655	3.605	-0.626	-0.901		
		P-value	0.112	0.002	0.538	0.377		
41	JHGRX	*Coefficients*	0.852	0.699	-0.262	-0.219	0.534	0.470
		t Stat	0.579	4.329	-1.099	-1.260		
		P-value	0.568	0.000	0.284	0.221		
42	JHRBX	*Coefficients*	0.669	0.697	-0.261	-0.219	0.534	0.470
		t Stat	0.456	4.328	-1.096	-1.260		
		P-value	0.653	0.000	0.285	0.221		

TABLE 3
(CONTINUED): REGRESSION STATISTICS (DEPENDENT VARIABLE: EXCESS QUARTERLY RETURN ON MUTUAL FUND - INDEPENDENT VARIABLES: RM-RF, SMB, HML FACTORS OF FAMA AND FRENCH)

	MF		*Intercept*	*Rm-Rf*	*SMB*	*HML*	*R Square*	*Adjusted R Square*
43	JHRCX	*Coefficients*	0.669	0.697	-0.261	-0.219	0.534	0.470
		t Stat	0.456	4.329	-1.098	-1.260		
		P-value	0.653	0.000	0.284	0.221		
44	MEDRX	*Coefficients*	0.994	0.824	-0.290	-0.272	0.533	0.470
		t Stat	0.565	4.271	-1.017	-1.308		
		P-value	0.578	0.000	0.320	0.204		
45	SBIAX	*Coefficients*	0.292	0.706	-0.507	-0.029	0.463	0.386
		t Stat	0.178	4.193	-2.039	-0.139		
		P-value	0.860	0.000	0.054	0.891		
46	SBHBX	*Coefficients*	0.108	0.704	-0.507	-0.031	0.462	0.385
		t Stat	0.066	4.190	-2.043	-0.150		
		P-value	0.948	0.000	0.054	0.882		
47	SBHLX	*Coefficients*	0.115	0.704	-0.507	-0.032	0.463	0.386
		t Stat	0.070	4.191	-2.041	-0.153		
		P-value	0.945	0.000	0.054	0.880		
48	HCRAX	*Coefficients*	1.245	0.775	-0.232	-0.148	0.437	0.360
		t Stat	0.631	3.580	-0.725	-0.633		
		P-value	0.534	0.002	0.476	0.533		
49	HCRBX	*Coefficients*	1.051	0.774	-0.234	-0.148	0.436	0.360
		t Stat	0.533	3.578	-0.731	-0.633		
		P-value	0.599	0.002	0.472	0.533		
50	HCRCX	*Coefficients*	1.054	0.776	-0.234	-0.146	0.439	0.362
		t Stat	0.536	3.596	-0.733	-0.628		
		P-value	0.597	0.002	0.471	0.537		
51	HCRDX	*Coefficients*	1.303	0.775	-0.232	-0.148	0.436	0.359
		t Stat	0.659	3.574	-0.724	-0.630		
		P-value	0.517	0.002	0.477	0.535		
52	MFHAX	*Coefficients*	3.169	1.296	0.134	-0.676	0.607	0.553
		t Stat	1.068	3.981	0.278	-1.924		
		P-value	0.297	0.001	0.784	0.067		
53	MFHBX	*Coefficients*	2.982	1.293	0.131	-0.676	0.606	0.553
		t Stat	1.006	3.976	0.273	-1.927		
		P-value	0.325	0.001	0.787	0.067		
54	MFHCX	*Coefficients*	2.970	1.292	0.134	-0.676	0.606	0.553
		t Stat	1.003	3.974	0.279	-1.927		
		P-value	0.327	0.001	0.783	0.067		
55	MFHKX	*Coefficients*	3.171	1.296	0.134	-0.677	0.606	0.552
		t Stat	1.067	3.973	0.279	-1.924		
		P-value	0.297	0.001	0.783	0.067		
56	MFHYX	*Coefficients*	3.243	1.297	0.133	-0.677	0.607	0.553
		t Stat	1.092	3.979	0.276	-1.926		
		P-value	0.287	0.001	0.785	0.067		

TABLE 3
(CONTINUED): REGRESSION STATISTICS (DEPENDENT VARIABLE: EXCESS QUARTERLY RETURN ON MUTUAL FUND - INDEPENDENT VARIABLES: RM-RF, SMB, HML FACTORS OF FAMA AND FRENCH)

	MF		*Intercept*	*Rm-Rf*	*SMB*	*HML*	*R Square*	*Adjusted R Square*
57	PHSTX	*Coefficients*	1.380	0.825	**-0.504***	**-0.349***	0.658	0.611
		t Stat	1.061	5.777	-2.389	-2.266		
		P-value	0.300	0.000	0.026	0.034		
58	PHSBX	*Coefficients*	1.185	0.824	**-0.503***	**-0.348***	0.658	0.612
		t Stat	0.913	5.779	-2.389	-2.266		
		P-value	0.371	0.000	0.026	0.034		
59	PCHSX	*Coefficients*	1.198	0.823	**-0.503***	**-0.350***	0.658	0.611
		t Stat	0.922	5.773	-2.389	-2.277		
		P-value	0.367	0.000	0.026	0.033		
60	PMHSX	*Coefficients*	1.252	0.824	**-0.504***	**-0.349***	0.658	0.611
		t Stat	0.964	5.779	-2.392	-2.267		
		P-value	0.346	0.000	0.026	0.034		
61	RYOAX	*Coefficients*	0.638	1.262	0.077	-0.563	0.679	0.635
		t Stat	0.268	4.835	0.200	-2.002		
		P-value	0.791	0.000	0.843	0.058		
62	RYOIX	*Coefficients*	0.764	1.263	0.079	-0.565	0.679	0.635
		t Stat	0.321	4.834	0.205	-2.004		
		P-value	0.751	0.000	0.839	0.058		
63	RYHAX	*Coefficients*	-0.069	0.697	-0.427	0.072	0.478	0.407
		t Stat	-0.048	4.370	-1.812	0.417		
		P-value	0.962	0.000	0.084	0.681		
64	RYHIX	*Coefficients*	0.078	0.699	-0.429	0.068	0.480	0.409
		t Stat	0.054	4.389	-1.824	0.398		
		P-value	0.958	0.000	0.082	0.695		
65	SHPAX	*Coefficients*	1.929	1.004	-0.157	**-0.778***	0.471	0.398
		t Stat	0.639	3.033	-0.321	-2.179		
		P-value	0.529	0.006	0.751	0.040		
66	SHPBX	*Coefficients*	1.772	1.005	-0.156	**-0.780***	0.473	0.401
		t Stat	0.589	3.044	-0.320	-2.189		
		P-value	0.562	0.006	0.752	0.039		
67	SHPCX	*Coefficients*	0.257	1.018	-0.188	-0.506	0.432	0.351
		t Stat	0.081	3.139	-0.393	-1.254		
		P-value	0.936	0.005	0.699	0.224		
68	PRHSX	*Coefficients*	2.256	0.965	-0.097	-0.297	0.579	0.522
		t Stat	1.105	4.309	-0.292	-1.230		
		P-value	0.281	0.000	0.773	0.232		
# of positive intercept (out of 68)								64.000**
# of negative intercept (out of 68) Average of R Square					0.518			4.000**

*Significant at 0.05 level; **None of them significant at 0.05 level.

CONCLUSIONS

There are two separate messages to take away from this. First, the three factors together account for an average 51.81% of a portfolio's behavior. It would be wonderful if three-factor model explained everything, but it does not. Second, history indicates that small value "just happens" to deliver higher returns and higher volatility

than the stock market as a whole. In this study it is found that large growth mutual funds delivered abnormal performance. Table 3 results show the intercept (i.e. the fund's alpha or the abnormal performance). A reliably positive measure of the intercept would indicate that the mutual fund manager is adding value to the portfolio, beyond merely allocating investments to provide varying degrees of exposure to the three risk factors. The relatively low t-statistic (or high p-value) however undermines the manager's claim of adding value and indicates that the intercept was more likely to have happened by chance (i.e. it is not statistically different from zero). Though 64 mutual funds out of 68 had positive intercept (or positive abnormal performance), none of them was significant at 0.05 level. Four mutual funds out of 68 had negative intercept, but again not significant at 0.05 level. The empirical results indicate that overall the predictive ability of size and book to market factors diminished for the period 2000-2006. Tobin said high-risk investors should buy the total stock market index on margin, Fama and French offered the saner alternative of just adding some Small Value to your portfolio. This study finds adding large growth to your portfolio provided abnormal performance in case of some Health mutual funds.

How a portfolio is structured for optimal exposure to the three risk factors determines how well the portfolio performs relative to other portfolios. Portfolio structure refers to the indexes the portfolio holds and in what proportions. The Fama/French findings offer guidelines to investors for effectively allocating indexes within a portfolio. The allocation decision is crucial, since the degree of exposure to the three risk factors for equities accounts for nearly all the returns earned by diversified portfolios of stocks. That's why investors should focus on properly structuring their portfolios rather than trying to pick winning stocks or managers.

ENDNOTES

1. There's actually another interpretation that's so much less cerebral than the one offered that it's probably correct. The broad market index weights stocks according to their market capitalization, making it size-biased and valuation blind; so maybe the extra two factors in this model are just a couple of tweaks to adjust for these two problems. This also explains why momentum is sometimes used as yet another factor: market capitalization shows where the market has been putting its money for years, while momentum shows where it has been putting it lately; so if you want to take advantage of market efficiency you start with the index and then tweak it a little with momentum.
2. http://www.investorsolutions.com/lclibrary.cfm?show=detail&articleID=78&artcategory=1

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