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**Performance Measures of Actively Managed Equity Mutual  
Funds.**

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# Performance Measures of Actively Managed Equity Mutual Funds

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## Abstract

We study the performance of US actively managed equity mutual funds with traditional models and find, as in previous studies, that they obtain negative performance. We argue that this pessimistic result is explained by the excessively high expenses charged by managers. Managers justify these costs as being generated by their information acquisition activity. We hence propose a performance model in which information asymmetries are explicitly accounted for. We show in this paper that managers charge, on average, expenses that are not justified by informational asymmetries. Managers appear to have stock picking talents, but do not make their clients get the benefit. We finally address the question of the link between the funds' performance and its management characteristics.

**Key-words:** private information, information risk, actively managed equity mutual funds, selectivity performance, rational expectations equilibrium models

**JEL Classification:** G11, G12, G14

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## 1. Introduction

The question whether actively managed equity mutual funds have stock-picking talents has attracted a tremendous interest from academics and practitioners, undoubtedly because these funds control the largest part of mutual fund assets.

In traditional studies, fund performance is measured by the alpha from models proposed by Jensen (1996), Fama & French (1993) and Carhart (1997). In these models, mutual fund net returns (i.e., returns after deduction of expenses) are adjusted for factors of risk such as the systematic, size, book to market (BM) and momentum factors. According to these models, informed agents are able to beat the market since they detain superior information on market-traded securities. Following Grossman & Stiglitz (1980), their extra-performance equalizes, at equilibrium, information-acquisition costs. It follows that the systematic-risk adjusted alpha earned by actively managed funds should be zero if returns are net of information-acquisition costs (Jensen, 1968).

Traditional studies find *negative* risk-adjusted abnormal returns<sup>1</sup>. Some authors explain these pessimistic results by the existence of market imperfections such as transaction or liquidity costs (e.g., Edelen, 1999).

Our explanation is that expenses cannot be justified only by the mutual funds' information acquisition activities. Expenses are at the managers' discretion and embed costs that are not exclusively related to the information acquisition process. This aspect has been thoroughly proved in previous empirical studies (e.g., Gruber, 1996).

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<sup>1</sup> Jensen (1968), Henriksson (1984), Chang & Lewellen (1984), Grinblatt & Titman (1989, 1993), Malkiel (1995), Gruber (1996), Grinblatt *et al.* (1995), Carhart (1997), Wermers (1997) and Chen *et al.* (2000), among others.

We propose to separate the issue of how much value the manager creates from the issue of how much expenses he/she charges. The theory offers two equivalent views.

The first view is that the abnormal *gross* returns adjusted for *traditional risks* of optimally managed portfolios are just enough to compensate information acquisition costs. Similarly, it means that the abnormal *net* returns adjusted for *traditional risks* of optimally managed portfolios are equal to zero.

The second view is that abnormal *gross* returns adjusted for the *traditional and information risks* are equal to zero.

This shows that information acquisition costs and the average information risk premium of the assets detained by the portfolio are equal, independently of how much informational advantages investors possess. A skilled manager is therefore one who is able to earn enough systematic-risk adjusted abnormal returns to compensate for information costs or, *equivalently*, for information risk.

We consider a performance model in which information costs are explicitly accounted for. Indeed, existing performance models do not allow distinguishing well known stocks from stocks strongly submitted to informational asymmetries. On the contrary, our model precisely takes into account informational asymmetries as an explanatory variable of mutual funds performance. If the expenses charged by funds' managers are justified by their information acquisition activities, these expenses should equal their information costs and thus, this information risk premium<sup>2</sup>.

For constructing our performance model, we add (to the traditional factors of risk such as the systematic, size, Book to Market (BM) and momentum factors) an information-risk factor appraised with the factor-mimicking portfolio *FSRVF*. The latter is based on the firm's specif-

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<sup>2</sup> The markets are assumed to be efficient.

ic return variation, hereafter FSRV, a measure of price informativeness proposed by Durnev et al. (2004).

We consider a sample of 6,623 US actively managed equity mutual funds on the period between January 1980 and December 2006. Using the Carhart's (1997) model, we find that the average net alpha is negative and significant at the 1% level, of about -140 basis points per year. In our view, this result, which is similar to those obtained in previous studies, does not necessarily represent evidence of poor stock-picking abilities. It may indicate that managers charge expenses that are excessively high, lowering the fund's net performance.

By adjusting the Carhart's performance measure for the information risk factor, the average fund alpha is positive, of about 9.7 basis points per year, but however not significant. This evidence indicates that fund managers earn sufficient returns for exactly compensating for information risk, and that they charge fees not justified by informational asymmetries. This also comes as a justification of informational efficiency of financial markets, as defined by Grossman and Stiglitz (1980).

The paper is structured per sections as it follows. The next section provides our argument in more details and provides the specification of our mutual fund performance model. Section three presents our database and some descriptive statistics for our sample funds. Section four analyzes the average fund performance adjusted for information risk in order to assess the managers' stock-picking abilities. Section five presents the link between the fund abnormal return and its management characteristics. The last section concludes and provides some issues of future inquiry.

## 2. The Performance Model

The traditional way to measure the performance of actively managed mutual funds is to adjust fund net returns for systematic risk. This approach has been proposed by Jensen (1968) and is based on the following regression,

$$r_{it} - r_{ft} = \text{ALPHA}_i + \beta_i^M (r_{mt} - r_{ft}) + \varepsilon_{it} \quad (1)$$

where  $r_{it}$  is the *net* return of fund  $i$  over the period  $t$ ,  $r_{ft}$  is the risk-free rate of return,  $\text{ALPHA}_i$  is the regression's intercept,  $r_{mt}$  is the market portfolio's return, and  $\varepsilon_{it}$  is the error term. Other performance models are premised onto the observation of anomalies such as size, BM and momentum, which appear to significantly explain stock returns (e.g., Fama & French, 1993). Fama & French, (1993) propose a model that accounts for the size and BM factors,

$$r_{it} - r_{ft} = \text{ALPHA}_i + \beta_i^M (r_{mt} - r_{ft}) + \beta_i^{\text{SMB}} \text{SMB}_t + \beta_i^{\text{HML}} \text{HML}_t + \varepsilon_{it} \quad (2)$$

where the extra variables  $\text{SMB}_t$  and  $\text{HML}_t$  are, for the first one, the difference in returns between small and large capitalization stocks and, for the second one, the difference in returns between high and low BM stocks. Carhart (1997) extended the Fama & French (1993) model by adding the momentum factor,

$$r_{it} - r_{ft} = \text{ALPHA}_i + \beta_i^M (r_{mt} - r_{ft}) + \beta_i^{\text{SMB}} \text{SMB}_t + \beta_i^{\text{HML}} \text{HML}_t + \beta_i^{\text{UMD}} \text{UMD}_t + \varepsilon_{it} \quad (3)$$

where the added variable,  $\text{UMD}_t$ , is the difference in returns between stocks with high and low past returns.

In these models, the returns are given *net* of expenses. The idea is that, in order to select stocks, managers must collect and analyze information. In this case, after expenses, the alphas in equations (1), (2) and (3) have to equalize zero.

The majority of the empirical analyses using these models give negative alphas. Two explanations are possible. The first is that managers have, on average, bad stock-picking talents. The second one is that the expenses are not a good measure of information-acquisition costs. We base our analysis on the assumption that managers charge expenses that are different from information acquisition costs. To overcome this problem, we add an information-risk factor in regression (3) and consider *gross* returns.

The information factor is appraised with the idiosyncratic risk factor portfolio, hereafter *FSRVF*. This factor-mimicking portfolio *FSRVF* is based on the Firm Specific Return Variation (FSRV) proxy introduced by Durnev et al. (2004). The degree of private information of a given stock is calculated with the measure FSRV. This measure of private information has been thoroughly tested on the US market (Durnev et al., 2004) and is frequently used by empiricists to analyze issues related to private information. The main advantage of FSRV is that it does not require long series of data to be computed. Moreover, it only uses stock returns and the market portfolio returns.

The FSRV proxy is calculated each month with daily data from the previous twelve months. FSRV is computed for each common stock  $i$  and each month by projecting the stock's daily returns, over the previous twelve months (minimum 60 returns)<sup>3</sup>, on the daily returns of the market portfolio and those of the three-digit industry portfolio of stock  $i$  excluding the latter:

$$r_{i,t} = \beta_{i,0} + \beta_i^{SIC3} r_{i,t}^{SIC3} + \beta_i^m r_t^m + \varepsilon_{i,t} \quad (4)$$

where  $r_{i,t}$  is the return of stock  $i$ ,  $r_{i,t}^{SIC3}$  is the return of its three-digit industry portfolio (formed with all securities having the same first three-digit SIC codes as the target stock  $i$ ), and  $r_t^m$  is the return of the market portfolio. Unexposed analyses show that using data with

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<sup>3</sup> If there are less than 60 available returns during the previous 12-month period, then we consider the stock's FSRV as missing for the target month.



other frequency (such as weekly data) for computing idiosyncratic risk do not change qualitatively our results.

Once FSRV is determined for each stock, the next step is to create the FSRVF factor-mimicking portfolio. The procedure we use for constructing *FSRVF* is similar to that employed by Easley *et al.* (2005) for the PIN composite portfolio, and in the same spirit as the traditional factors appraising the size and BM risks, i.e., SMB and HML. Precisely, FSRVF represents a portfolio long in stocks with strong degrees of private information, and short in stocks with low levels of private information.

Since we find that FSRV is correlated to the firm's capitalization, we first isolate size effects. At the beginning of each year, we sort stocks into size deciles based on market capitalization at the end of the prior year. Stocks are then sorted, in each size decile, in three portfolios based on their mean FSRV estimated over the prior year. This procedure yields 30 portfolios with approximately equal numbers of stocks. All these portfolios are value-weighted. The return of the "high" ("low") FSRV portfolio is the equally weighted return of the 10 portfolios with "high" ("low") FSRV stocks. The return of the FSRVF portfolio is the return of the "low" FSRV portfolio minus the returns of the "high" one. A low FSRV indicates a low price informativeness, thus a high degree of information asymmetry between investors, according to the theoretical and empirical justifications given by the literature.

Based on this, we propose the following performance model,

$$r_{it} - r_{ft} = \text{ALPHA}_i + \beta_i^M (r_{mt} - r_{ft}) + \beta_i^{\text{SMB}} \text{SMB}_t + \beta_i^{\text{HML}} \text{HML}_t + \beta_i^{\text{UMD}} \text{UMD}_t + \beta_i^{\text{PINF}} \text{FSRVF}_t + \varepsilon_{it} \quad (5)$$

where  $\text{FSRVF}_t$  is the difference in returns between stocks with high and low private information content and  $\varepsilon_{it}$  is the error term. This model can be viewed as a generalized version of the Carhart's (1997) model that adjusts for information risk.

We expect that the average fund alpha adjusted for information risk be indistinguishable from zero, according to the Grossman & Stiglitz's (1980) model.

We have also used a “PINF” factor-mimicking portfolio, based on the “probability of information-based trading”, PIN, a private information measure proposed by Easley et al. (2005). The data availability for PIN goes from 1984 to 2002. We have carried out the same empirical tests as the ones presented in this paper for both PINF and FSRVF over the 1984-2002 period<sup>4</sup>. The results obtained with the PINF factor over the 1984-2002 period are identical to the ones presented in this paper with FSRVF over the 1980-2006 period. In particular, we find that the fund alpha adjusted for information risk using PINF is not significant. We however note that the alpha adjusted for information risk using FSRVF over the period from 1984 to 2002 is positive and significant, while it is insignificant on the period from 1980 to 2006.

### **3. Data and Descriptive Statistics**

Our fund sample comprises 6,623 actively managed equity US mutual funds. They are collected from the CRSP Mutual Fund Database. The analysis period is from January 1980 to December 2006. The funds are chosen as in previous studies. We select all equity funds which investment objectives are “Aggressive”, “Balanced”, “Flexible”, “Growth”, “Income”, “Mid-Cap”, and “SmallCap”. We exclude mutual funds with less than 5 years of return data and less than 50% invested in common stocks.

Table I provides some descriptive statistics for the entire fund sample and for sub-samples based on funds' investment objectives and their survival status. Sample funds cover a relatively large scale in terms of total net assets (TNA), expense ratios, and turnover rates. We note that aggressively managed mutual funds, such as those belonging to the categories “Aggres-

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<sup>4</sup> Tables available on request.

sive”, “MidCap” and “SmallCap”, exhibit higher expense ratios and turnover than others. This may suggest that the managers of these funds make more efforts in order to acquire informational advantages.

(Insert table I about here)

Table II provides descriptive statistics on the returns of the factor-mimicking portfolios together with their Pearson correlation coefficients. Our proxy for the market portfolio is the value weighted CRSP portfolio including all common stocks from the NYSE, AMEX and NASDAQ markets. These returns have been extracted from the CRSP Monthly Stock Database. The returns of the “Small Minus Big” capitalization stocks (SMB), “High Minus Low” BM stocks (HML), and “Momentum” (UMD for “Up Minus Down” previous returns) portfolios are extracted from the Kenneth French website<sup>5</sup>.

(Insert table II about here)

We note that the highest average return is found for the momentum portfolio, followed by the market, HML and SMB portfolios. The positive correlation between FSRVF and the market portfolio is not surprising if one takes into account the way FSRVF is constructed. We also note a positive correlation between FSRVF and SMB, which is natural, since small firms are affected by stronger informational asymmetries. The negative correlation between FSRVF and HML means that firms with lower BM values have stronger degrees of informational asymmetries. This result is in line with the conventional view that a higher firm market value relative to its book value indicates the presence of stronger investment opportunities. Since the latter are better known by the firm’s manager, the firm is more affected by informational asymmetries.

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<sup>5</sup> [http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data\\_library.html](http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html)

#### 4. Fund Exposition to Private Information and Performance

This section analyzes mutual funds' stock-picking performance with the traditional performance models of Fama & French (1993) and Carhart (1997), and with our performance model that adjusts mutual fund returns for information risk.

The theory predicts that the gross fund alpha adjusted for information risk and the net fund alpha not adjusted for this type of risk should be indistinguishably different from zero. To check this, we run regressions (2), (3), (5) and (5) without the UMD factor for each individual fund on the entire period of return availability. Table III provides the equally-weighted average alpha and factor loadings for the performance models.

(Insert table III about here)

With the traditional models, which are based on net returns, all factors of risk are significant and the average alpha is significantly negative. The market and SMB factors exhibit the strongest loadings. The exposition to HML and momentum is lower, but still highly significant. With the Carhart's (1997) model, funds earn, on average, a risk-adjusted abnormal return of minus 140 basis points per year, which is significant at the 1% level ( $t$ -statistic of 14.31).

With the Carhart's (1997) model adjusted for information risk, which is based on gross returns, mutual funds exhibit, on average, a small and non significant, however positive alpha of 9.7 basis points per year. We note that the loadings on the market, SMB and HML factors are close to those found with the Carhart's (1997) model. The loading on FSRVF is 0.019, highly significant with a  $t$ -statistic of 5.032. With the model adjusted for information risk but excluding the UMD factor, the loadings on the factors are nearly the same; for example, the loading on FSRVF is nearly 0.02, with a  $t$ -statistic of 3.123.

The above analysis suggests two key interpretations. First, the positive exposition of actively managed funds to the information factor FSRVF suggests that they invest notably in

common stocks with high private information content. This result appears to contradict the Falkenstein's (1996) assertion that fund managers prefer securities that are transparent to the market and behave "*like the public*". Second, since the average alpha adjusted for information risk is not significantly different from zero, fund managers' asset-allocation decisions appear to be correct. Mutual funds earn, on average, enough abnormal returns to exactly compensate for information risk. The negative and significant alpha obtained with the Carhart's (1997) model is not, in our view, the consequence of poor asset allocation decisions, but the consequence of the excessive fees charged by mutual funds.

## **5. Performance and Management Characteristics**

We complete our analysis of mutual funds' performance by analyzing the link between the fund abnormal return and its management characteristics. Mutual fund clients are expected to pay just what is needed for the quality of the manager's information. Mutual funds' management characteristics should, therefore, have no impact on performance. The results obtained by prior studies suggest, however, that mutual funds do not recoup investment costs through higher performance. For example, Carhart (1997) finds that funds' expenses and turnover are negatively related to performance. Chen *et al.* (2004) find that the fund's size erodes managers' investment abilities. These studies account for information risk through expenses since they use net returns. According to our discussion in the paper's introduction, this approach is problematic if expenses are not a good empirical proxy for information-acquisition costs.

In this section, we estimate the cross-sectional relationship between fund performance and management characteristics. We first expose the link between mutual funds net returns and their characteristics, using the Fama & French's (1993) and Carhart's (1997) models. We, then, extend this study and analyze the links between, on the one hand, the funds' gross returns adjusted for the traditional factors of risk and information risk, and, on the other hand,

funds' management characteristics (such as TNA, expenses, turnover and total loads). We measure fund performance each month by subtracting the expected fund returns from observed ones, this difference being designated hereafter by *AR* for "Abnormal Return".

*Estimating abnormal net returns with traditional models*

With the traditional Fama & French (1993) specification considering net returns, a fund's abnormal return over month *t* is

$$AR_{it} = r_{it} - r_{ft} - \hat{\beta}_{i,t-1}^M (r_{mt} - r_{ft}) - \hat{\beta}_{i,t-1}^{SMB} SMB_t - \hat{\beta}_{i,t-1}^{HML} HML_t, \quad (6)$$

where  $AR_{it}$  is the abnormal return of fund *i* over month *t* and  $\hat{\beta}_{i,t-1}^M$ ,  $\hat{\beta}_{i,t-1}^{SMB}$ ,  $\hat{\beta}_{i,t-1}^{HML}$  are the fund's *i* loadings to the systematic, size and BM risk factors. These loadings are estimated with regression (5) using data from the previous 36 months.

With the traditional Carhart's (1997) specification considering net returns, a fund's abnormal return over month *t* is

$$AR_{it} = r_{it} - r_{ft} - \hat{\beta}_{i,t-1}^M (r_{mt} - r_{ft}) - \hat{\beta}_{i,t-1}^{SMB} SMB_t - \hat{\beta}_{i,t-1}^{HML} HML_t - \hat{\beta}_{i,t-1}^{UMD} UMD_t, \quad (7)$$

where  $\hat{\beta}_{i,t-1}^{UMD}$  is the fund's *i* loadings to the momentum risk factor. Loadings are estimated with regression (5) using data from the previous 36 months.

*Estimating abnormal gross returns when taking into account information risk*

With the specification considering gross returns and taking into account information risk, see equation (5), a fund's abnormal return over month *t* is

$$AR_{it} = r_{it} - r_{ft} - \hat{\beta}_{i,t-1}^M (r_{mt} - r_{ft}) - \hat{\beta}_{i,t-1}^{SMB} SMB_t - \hat{\beta}_{i,t-1}^{HML} HML_t - \hat{\beta}_{i,t-1}^{UMD} UMD_t - \hat{\beta}_{i,t-1}^{FSRVF} FSRVF_t, \quad (8)$$

where the notations are the same as previously, and  $\hat{\beta}_{i,t-1}^{FSRVF}$  is the fund's  $i$  loadings to the information risk factor. Loadings are estimated with regression (5) using data from the previous 36 months.

*Estimating the link between abnormal returns and funds' characteristics*

The cross-sectional relationship between abnormal returns and management characteristics is analyzed following the Fama & MacBeth (1973) procedure. Its specification is

$$AR_{it} = \gamma_{0t} + \gamma_{1t}EXP_{i,t-1} + \gamma_{2t}LTNA_{i,t-1} + \gamma_{3t}TNV_{i,t-1} + \gamma_{4t}TLOAD_{i,t-1} + \varepsilon_{it} \quad (9)$$

where  $AR_{it}$  is the abnormal return of fund  $i$  over month  $t$ ,  $EXP_{i,t-1}$  is the fund's expense ratio,  $LTNA_{i,t-1}$  is the natural logarithm of fund's total net assets,  $TNV_{i,t-1}$  is the turnover rate and  $TLOAD_{i,t-1}$  are fund's total loads. All the explanatory variables are lagged since we intend to predict performance, not to explain it. Precisely, they are considered at the end of the year preceding month  $t$ .

(Insert table IV about here)

The results are provided in table IV. Using *net* returns, expenses have a negative and significant impact on fund abnormal net returns appraised by the traditional models of Fama & French (1993) and Carhart (1997). If abnormal returns are based on the model using gross returns and accounting for information risk, the relationship between performance and expenses is negative, however not significant. These results are in line with our interpretation that managers charge expenses that are higher than information acquisition costs. If the two amounts were equal, then one should observe a positive relationship between expenses and future gross returns. Higher information acquisition costs would, indeed, translate into higher informational advantages, therefore in higher future returns. Since expenses seem to be disconnected from the efforts managers make to acquire information, we assert that fund *net* re-

turns are not only related to how much value managers are able to create, but also to the fees policy, which is another issue. For this reason, we believe that the traditional approach with net returns for measuring fund performance is relevant to appraise fund performance from the client's perspective, but this approach does not allow for correctly appraising fund managers' true skills.

We note also a non significant impact of turnover on fund performance, a similar result being found by Kacperczyk *et al.* (2005).

To check the robustness of our results, we have replicated our analyses with the sample excluding the observations from fund deciles with extreme loadings on FSRVF. We have also replicated our Fama & MacBeth (1973) regressions on the two non-overlapping sub-periods, 1980-1993 and 1994-2006. Other known fund performance determinants have been accounted for, such as the number of managers' change per fund or the fund's age since its inception. In all cases, we have found similar (unreported) results.

## **6. Conclusion**

Empirically, Easley *et al.* (2002) show that information risk has a strong impact on common stock returns, consistent with the notion that asymmetrically-informed investors require a premium for information risk. For these conceptual and empirical reasons, we argue that a good assessment of fund performance requires an adjustment for information risk. In theory, the expected abnormal return earned by the optimal investors' portfolio on a market with information asymmetry equals zero with traditional models, which consider net returns, and also with a model adjusting for information risk, which considers rather gross returns.

With traditional models, we find, as in previous studies, a negative fund performance, which may suggest that fund managers have a bad expertise. While this view is shared by most previous empiricists, we rather propose a more optimistic explanation which is that ex-



penses are not a good measure of information-acquisition costs. We consider a model adjusting for information risk, using gross returns. We find that the information factor has a strong impact on fund returns. This result is seemingly contradicting the view expressed by Falkenstein (1996) who argues that funds behave “*like the public*” in the sense that they prefer securities that are transparent for the market and avoid securities with high private information content. Importantly, the fund alpha adjusted for information risk is, on average, small and not significantly different from zero. This picture is more optimistic than that offered by previous studies and suggests that actively managed funds earn, collectively, enough abnormal returns to exactly compensate for information risk. This result confirms the informational efficiency of financial markets as defined by Grossman and Stiglitz (1980). The pessimistic picture provided by prior studies is related to the fact that these studies focus on net performance and thus consider implicitly that expenses are a good empirical proxy for information acquisition costs. Since managers charge expenses that are higher than information costs, these studies underestimate the true fund managers' stock-picking abilities.

A fruitful continuation of our research would be to analyze the performance of fund portfolio's holding stocks by adjusting for information risk. This allows for a more precise assessment of stock-picking skills than our approach since we analyze the performance at the portfolio level. Our results may be biased by the existence of assets others than common stock in mutual fund portfolios. A more precise assessment of the private information factor represents also a challenge for future research.

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**Table I**  
**Summary Statistics for Mutual Funds**

This table presents equally-weighted averages of fund characteristics for 6,623 actively managed equity mutual funds on the period from January 1980 to December 2006. "Number of funds" is the total number of surviving and dead funds on the analysis period. "Average number of years" represents the equally-weighted average of the number of years with return data available for each fund. "TNA" (Total Net Assets) is the closing market value of securities owned, plus all assets, minus all liabilities. "Expenses" (over the calendar year) are the percentage of the total investment that shareholders pay for the mutual fund's operating expenses. "Turnover" (over the calendar year) is the minimum of aggregate purchases of securities or aggregate sales of securities, divided by the average TNA of the fund. "Total Loads" are the sum between front-end, rear-end, and deferred sales charges as a percentage of the investment.

Group of funds	Number of funds	Average number of years	Average TNA	Average Expense Ratio (%/year)	Average Turnover Rate (%/year)	Average Total Loads (%/year)
All funds	6,623	9.03	498.52	1.49	1.02	1.44
Aggressive	552	8.10	452.35	1.86	1.69	1.33
Balanced	576	10.62	594.25	1.35	0.99	1.34
Flexible	286	7.74	322.86	1.56	0.91	1.42
Growth	3,798	10.51	696.29	1.35	0.77	1.58
Income	391	10.99	785.28	1.30	0.61	1.76
MidCap	891	8.59	367.97	1.48	1.17	1.51
SmallCap	1,335	6.67	270.65	1.55	1.00	1.15

**Table II**

**Summary Statistics and Pearson Correlation Coefficients for Factor-Mimicking Portfolios**

This table presents percentage average annual returns, annual return standard deviation, the *t*-statistic for the hypothesis that the mean return is zero, see Panel A, and Pearson correlation coefficients for the monthly returns of five factor-mimicking portfolios, see Panel B. The portfolios are the Fama & French (1993) "SMB" (for "Small Minus Big" capitalization stocks), "HML" (for "High Minus Low" book-to-market stocks) and "UMD" (for "Up Minus Down" prior stock returns) portfolios. FSRVF (for "Firm Specific Return Variation Factor") is a size neutralized portfolio long (short) in stocks with high (low) private information content. The analysis period is from January 1980 to December 2006.

Panel A

Factor-Mimicking Portfolio	Mean Return (%/year)	Annual Return Standard Deviation (%/year)	<i>t</i> -Statistic of Mean Return
Market	7.80%	15.51%	2.477
SMB	1.53%	11.29%	0.689
HML	5.11%	11.04%	2.305
UMD	10.72%	15.22%	3.426
FSRVF	0.70%	10.10%	0.352

Panel B

Factor-Mimicking Portfolio	Pearson Correlation Coefficients between the Returns of Factor-Mimicking Portfolios			
	SMB	HML	UMD	FSRVF
Market	0.204	-0.515	-0.026	0.673
SMB	I	-0.402	0.112	0.303
HML		I	-0.124	-0.660
UMD			I	-0.194
FSRVF				I

Table III

Performance Models' Coefficient Estimates

This table presents equally-weighted average coefficient estimates for the regression of monthly fund returns on the returns of factor-mimicking portfolios for 6,623 US actively managed equity funds on the period between January 1980 and December 2006. The regression is performed for each individual fund on the entire period of return availability (every fund has a minimum of five years of data availability). Returns are net of expenses in the traditional models of Fama & French (1993) and Carhart (1997), and gross of expenses in the models accounting for information risk. The models' specifications are:

$$\text{Traditional Models: } r_{it} - r_{ft} = \text{ALPHA}_i + \beta_i^M (r_{mt} - r_{ft}) + \beta_i^{\text{SMB}} \text{SMB}_t + \beta_i^{\text{HML}} \text{HML}_t + \beta_i^{\text{UMD}} \text{UMD}_t + \varepsilon_{it}$$

$$\text{Performance Models Integrating the Information Factor: } r_{it} - r_{ft} = \text{ALPHA}_i + \beta_i^M (r_{mt} - r_{ft}) + \beta_i^{\text{SMB}} \text{SMB}_t + \beta_i^{\text{HML}} \text{HML}_t + \beta_i^{\text{UMD}} \text{UMD}_t + \beta_i^{\text{FSRV}} \text{FSRV}_t + \varepsilon_{it}$$

The notations are as follows.  $r_{it}$  is the monthly return of the fund  $i$  over month  $t$  and  $\text{ALPHA}_i$  is the regression's intercept (the returns are measured gross or net of expenses);  $r_{ft}$  is the risk-free rate of return;  $r_{mt}$  is the return on the market portfolio;  $\text{SMB}_t$  is the difference in returns between small and large capitalization stocks  $t$ ;  $\text{HML}_t$  is the difference in returns between high and low book-to-market stocks;  $\text{UMD}_t$  is the difference in returns between stocks with high and low past returns;  $\text{FSRV}_t$  is the difference in returns between stocks with high and low amounts of private information. Three, two and one stars indicate a significance level of 0.01, 0.05, and 0.10, respectively.

MODELS	ALPHA (%/year)	Beta Market	Beta SMB	Beta HML	Beta UMD	Beta FSRV	Adjusted R <sup>2</sup>
Fama & French (1993)	-1.396 (-22.730)***	0.945 (340.083)***	0.168 (38.314)***	0.066 (14.823)***	-	-	0.858
Carhart (1997)	-1.403 (-14.316)***	0.953 (278.875)***	0.164 (33.372)***	0.062 (13.407)***	0.019 (7.470)***	-	0.871
Adjusted information model	0.097 (0.938)	0.955 (213.162)***	0.167 (32.760)***	0.059 (11.482)***	0.012 (4.706)***	0.019 (5.032)***	0.874
Adjusted information model (UMD excluded)	0.083 (1.204)	0.951 (185.289)***	0.169 (36.182)***	0.061 (9.913)***	-	0.020 (3.123)***	0.863

Table IV

**Relation between Performance and Fund Characteristics**

This table presents estimates from the Fama & MacBeth (1973) regression of monthly mutual fund abnormal returns (AR) on their management characteristics. The analysis is performed on 6,623 US actively managed equity funds on the period between January 1980 and December 2006. The regressions are performed cross-sectionally each month and then the coefficient estimates are averaged through time with the Fama & MacBeth (1973) methodology. The regression specification is:

$$AR_{it} = \gamma_{0t} + \gamma_{1t} EXP_{it,t-1} + \gamma_{2t} LTNA_{it,t-1} + \gamma_{3t} TNV_{it,t-1} + \epsilon_t$$

where  $AR_{it}$  is the abnormal return of fund  $i$  over month  $t$ ;  $EXP_{it,t-1}$  is the expense ratio;  $LTNA_{it,t-1}$  is the lagged natural logarithm of fund's total net assets;  $TNV_{it,t-1}$  is the turnover rate;  $TLOADS_{it}$  is fund total loads. All explanatory variables are considered at the end of the year preceding month  $t$ . Abnormal returns are the difference between observed returns and expected ones. The latter are determined with the Fama & French (1993) and Carhart (1997) models based on net returns, and also with the model adjusting for information risk and thus considering gross returns. We provide precision-weighted average time-series coefficients (Litzenberger & Ramaswamy, 1979) and the  $t$ -statistic of the hypothesis that the mean is zero (between parentheses). Three, two and one stars correspond to a significance level of 0.01, 0.05, and 0.10, respectively.

Dependent Variable	Estimated Regression Coefficients		
	Regression Performed with ARs from the Three-Factor Model of Fama & French (1993)	Regression Performed with ARs from the Four-Factor Model of Carhart (1997)	Regression Performed with ARs from the Model Adjusting for Information Risk
Average $\gamma_{1,t}$ (%)	-0.103 (-6.744)**	-0.103 (-6.714)***	-0.011 (-0.695)
Average $\gamma_{2,t}$ (%)	0.000 (1.058)	0.000 (1.045)	0.000 (1.040)
Average $\gamma_{3,t}$ (%)	0.000 (1.591)	0.000 (-1.198)	0.000 (-1.176)
Adjusted $R^2$ (%)	2.507	2.019	1.908