Performance Evaluation of Religious Funds

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Abstract

This exploratory study uses monthly net return data from August 2008 to June 2015 on 5 actively managed religious funds to distinguish between luck and skill of fund managers. The main benchmark of this study is the Fama-French-five-factor-model (2013). First, the abnormal performance, alpha, α_i, of the equally weighted mutual fund with the above five factor model is examined. Second, we use the bootstrapping simulation approach of Fama and French (2010), to separate manager's skill from luck. Equally weighted fund exhibits skill.

1. Introduction

Mutual fund investors focus particularly in the tails of performance distribution and are mainly interested to identify very good performers for investing or very bad performers to avoid. We find that standard, straightforward and simple multi-factor performance measures used in previous mutual fund studies have little ability to detect whether the positive or negative risk-adjusted abnormal performance (the "alpha") is due to skill or luck. The general consensus of mutual fund research is that restrictions placed on the screening criteria for stocks, result in less than optimal performance. So, as a test case, we choose a sample of five religious funds with restrictive screening. An equally-weighted fund is created out of these five funds and this equally-weighted fund has long-term superior performance based on a well-known performance evaluation technique: Fama-French-five-factor-model (2013). Then we use 1,000 simulations to apply the bootstrap-methodology with true alpha set to zero (i.e., assuming that fund has no stock picking ability). This helps us to determine whether or not manager/managers of this superior performing fund are skilled or lucky.

Kosowski et al. (2006) were among the first to apply the bootstrap method to mutual fund performance. This latest methodology was never applied before to religious funds. The bootstrap approach – as opposed to persistence studies - has several advantages, such as no assumptions are made about the distribution of returns and alphas of funds, and also a long-time series of performance can be used. In this study, we are able to separate 'skill' from 'luck' in the performance of equally-weighted religious funds, even when the distribution of idiosyncratic risk is highly non-normal. Our study provides new evidence on the abnormal performance measure of the religious funds and our paper's results are not easily inferred from other studies. Applying multi-factor model to a mutual fund involves considerations whose potential consequences cannot easily be studied without using longer time-series bootstrap simulations. Our study uses longer time series of performance.

2. Literature Review

Past academic studies of US mutual funds show little evidence of positive abnormal performance but present stronger evidence of poor performing funds. The evidence is not entirely definitive. Though several researchers document negative average fund alphas on a style adjusted basis, net of expenses and trading costs (see, Carhart (1997)), Christopherson et al (1998), and Hendricks et al (1993)) recent papers indicate that some fund managers have stock-selection skills. For example, Kosowski, Timmermann, Wermers, and White (2006) use a bootstrap technique to document outperformance by some funds. Avramov and Wermers (2006) show the benefits of investing in actively-managed funds from a Bayesian perspective. Cuthbertson et al. (2008) used data on UK equity funds from 1976 to 2002 and found an existence of stock picking ability among a small number of the top performing funds that they concluded was not solely due to luck. They also found that the underperforming funds demonstrate bad skill. Cuthbertson et al. concluded that for the majority of funds, positive abnormal performance could be attributed to good luck.

No study of religious funds so far has focused on measuring whether the realized performance was driven by skill or mere luck. This paper separates skill from luck in religious fund managers' investment performance by using a five factor model developed by Fama and French and apply the latest bootstrapping simulations methodology. Using this bootstrap technique we examine the performance of an equally-weighted Fund of five religious funds over the August 2008 through June 2015 period. We set alpha equal to zero under the hypothesis of pure luck and then compare it to actual observed performance.

3. Methodology

In 2013, Fama and French introduced a five-factor asset pricing model, adding profitability and investment factors to augment the three-factor model.

$$Rit - RFt = \alpha i + bi(RMt - RFt) + siSMBt + hiHMLt + riRMWt + ciCMAt + eit.$$

In this equation *RMWt* is the difference between the returns on diversified portfolios of stocks with robust and weak profitability, and *CMAt* is the difference between the returns on diversified portfolios of low and high investment stocks, which are called conservative and aggressive. If the sensitivities to the five factors, *bi*, *si*, *hi*, *ri*, and *ci,* capture all variation in expected returns, the intercept α*i*is zero for all securities and portfolios *i*.

First, the abnormal performance, alpha, α*i*, of the equally weighted mutual fund with the above five factor model is examined. A positive alpha implies that the manager has a positive impact on fund performance, and the opposite happens with a negative alpha.

Second, we use the bootstrapping simulation approach of Fama and French (2010), to separate manager's skill from luck. Following are the steps taken by this study: First, α and its t-statistic for the equally-weighted portfolio are estimated from five-factor Fama-French model. We subtract the estimated α from the mutual fund's monthly returns to generate adjusted return series with true true α of zero. Then, a random draw from these adjusted returns 83 times (with replacement) generated new return series per simulation run. Next, we estimate a new simulated α and t(α) per portfolio in each simulation. So, in this "no skill" (true alpha=0) simulation, the distribution of estimated alphas should always stick at zero.The estimated α value significantly differently from zero is suggests 'luck' factor. Finally the t (α) value at each percentile is computed as an average of the percentile values from all 1000 simulation runs.

Following Kosowski et al. (2006), Fama and French (2010) as well as Barras et al. (2010), we use the t-statistics of α, t (α), instead of α for the analysis. The distribution of the actual t (α) and the simulated t(α) are then compared to infer whether the actual distribution is generated by mere luck or whether some manager exhibits skill.

4. Data

The monthly data used for this study came from Morningstar Database and was from August 2008 through June 2015, a total period of 83 months.

For this study we consider Religious funds that invest according to a set of faith-based religious principles. Carolyn Bigda of Kiplinger's Personal Finance highlights five religious funds that do not levy sales loads and have delivered solid returns despite their investing constraints. These funds are shown in Table 1. Gross expense ratios for AMANX, AVEFX, AVEDX, ETGLX and AQEIX are respectively 1.15%, 0.55%, 0.93%, 1.45% and 1.5% with an average of 1.116%.

Table 1. Sample of five religious funds

Five funds as described by the Kiplinger article are:

1. LKCM Aquinas Value (symbol AQEIX) follows the guidelines of the U.S. Conference of Catholic Bishops.

2. Ave Maria Rising Dividend (AVEDX) takes a slightly different approach to investing according to Catholic values. The fund avoids companies with ties to abortion or pornography (including hotels that offer X-rated films in guest rooms). "It is a zero-tolerance policy," says co-manager George Schwartz. (But the fund doesn't specifically ban weapons makers.)

3. Eventide Gilead (ETGLX) is beneath the broad umbrella of Christian-oriented funds. Managers Finny Kuruvilla and David Barksdale believe work done in the service of others is blessed. So they look for firms that are sensitive to shareholders as well as to internal stakeholders (such as customers and employees) and external stakeholders (communities and the environment). They won't invest in companies that profit from alcohol, gambling and other potential addictions.

4. **Ave Maria Bond** (AVEFX) provides a fixed-income fund option. The fund applies the same Catholic principles of its stock-owning sibling to a mostly fixed-income portfolio.

5. A number of funds follow the principles of Islamic, or sharia, finance, including Amana Income (AMANX). Sharia bars investments in companies involved in alcohol, pork, gambling, pornography or tobacco. It also requires that investors avoid interest. One way manager Nicholas Kaiser and deputy manager Scott Klimo deal with that is to eliminate banks and companies whose total debt adds up to more than 33% of their stock market value.

5. Results

When excess return on, equally-weighted mutual fundis regressed on FF-5 factors for the period 8/2008 through 6/2015, Alpha is 0.155739% per month or Alpha is 1.8689% per year and T of Alpha is 2.088157. Results are shown in Table 2. The results show that the equal-weighted religious mutual fund portfolio has three-fourth exposure -close to 76%- to the market portfolio, but very little or almost no exposure to the size, value/growth returns, profitability and investment portfolio (0.10, -0.08, -0.06 and 0.004). Moreover, the five factors capture 97.5% of the variance of month-by-month equal-weighted fund returns.

Table 2. Regression Results

Excess return on Equally Weighted Mutual fund regressed on FF-5 factors

For the period 08/2008 through 6/2015

$Rit - RFt = \alpha i + bi(RMt - RFt) + siSMBt + hiHMLt + riRMWt + ciCMAt + eit.$

Regression Statistics	
Multiple R	0.9875852
R Square	0.9753245
Adjusted R Square	0.9737222
Standard Error	0.6264321
Observations	83

ANOVA

	df	SS	MS	F	Significance F
Regression	5	1194.325703	238.8651	608.702	2.2998E-60
Residual	77	30.21612415	0.392417		
Total	82	1224.541827			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	0.1557387	0.074581869	2.088157	0.04009	0.00722719	0.304250143
Mkt-RF	0.7643822	0.018653849	40.97718	4.8E-54	0.72723766	0.801526777
SMB	0.1002747	0.033428407	2.999685	0.003639	0.03371024	0.166839162
HML	-0.0812035	0.035970838	-2.25748	0.026812	-0.1528306	-0.009576452
RMW	-0.0630874	0.050850863	-1.24064	0.218507	-0.1643444	0.038169594
CMA	0.0041076	0.061291279	0.067018	0.946741	-0.1179389	0.126154154

Summary:	
Alpha is % per month	0.155739
or Alpha is % per year	1.8689
T of Alpha	2.088157
Percent rank of 2.088157	0.983166

Now the question is, whether a mutual fund, such as this equally weighted fund with a positive alpha relative to five-factor benchmark over some measurement period, say 83 months, can be identified as a superior fund?

In Table 3, Percentiles of t(alpha) estimates based on 1000 Simulations, with true alpha set to zero, are presented.99th percentile is 2.3267, the value (or score), below which 99 percent of the observations may be found.

Table 3. Percentiles of t(alpha) estimates for Equally-weighted fund based on 1000 Simulations With True alpha set to zero

Percentile	T(alpha) on 1000 Simulations
1	-2.618005197
2	-2.469242917
3	-2.1890989
4	-2.003127345
5	-1.784888138
10	-1.41942882
20	-1.026768416
30	-0.700077565
40	-0.435198886
50	-0.186713958
60	0.070645976
70	0.357186695
80	0.735234589
90	1.278628253
95	1.578980767
96	1.684952013
97	1.794741688
98	1.999904235
99	2.326772107

Comparing the distribution of "α" estimates from the simulations to the "α" estimates for actual fund returns allows us to draw inferences about the existence of skilled manager. The 't' statistic of 2.088157 of the actual estimated alpha of 0.155739 percent per month or 1.8689 percent has a percent rank of 98.3166and as such the equally weighted fund exhibits skill.

Tables 4 through 8 show the individual mutual fund regression results for different periods of data. Fama-French 5 factors yielded better results than traditional three factors.

Table 4. Amana Income Investor

Excess return on Mutual fund regressed on FF-5 factors on 07/1986 through 6/2015

Regression Statistics	
Multiple R	0.913985
R Square	0.835369
Adjusted R Square	0.832962

Standard Error	1.421702			
Observations	348			

ANOVA

	df	SS	MS	F	Significance F
Regression	5	3507.592	701.5184	347.0738	1.4E-131
Residual	342	691.2631	2.021237		
Total	347	4198.855			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	-0.07035	0.081064	-0.86781	0.386106	-0.2298	0.089099
Mkt-RF	0.754824	0.019484	38.74167	3.9E-127	0.716502	0.793147
SMB	-0.03324	0.028242	-1.17692	0.240046	-0.08879	0.022311
HML	0.146518	0.037483	3.908955	0.000112	0.072793	0.220244
RMW	0.081099	0.039294	2.063878	0.039783	0.00381	0.158388
CMA	0.09614	0.055544	1.730895	0.084372	-0.01311	0.20539

Table 5. Ave Maria Bond

Excess return on Mutual fund regressed on FF-5 factors on 06/2003 through 6/2015

Regression Statistics	
Multiple R	0.662509
R Square	0.438918
Adjusted R Square	0.418735
Standard Error	0.774835
Observations	145

ANOVA

	df	SS	MS	F	Significance F
Regression	5	65.28159	13.05632	21.74715	4.83E-16
Residual	139	83.45132	0.600369		
Total	144	148.7329			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	0.105669	0.067993	1.55412	0.12243	-0.02876	0.240102
Mkt-RF	0.177922	0.019949	8.918945	2.43E-15	0.13848	0.217364
SMB	-0.05026	0.032576	-1.54299	0.125106	-0.11467	0.014144
HML	0.049448	0.03323	1.488065	0.138999	-0.01625	0.115149
RMW	0.090665	0.051195	1.770976	0.078756	-0.01056	0.191887
CMA	0.000487	0.054256	0.008973	0.992854	-0.10679	0.10776

Table 6. Ave Maria Rising Dividend

Excess return on Mutual fund regressed on FF-5 factors on 6/2005 through 6/2015

Regression Statistics	
Multiple R	0.967007
R Square	0.935103
Adjusted R Square	0.932282
Standard Error	1.045652
Observations	121

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	5	1811.797	362.3594	331.4099	1.55E-66
Residual	115	125.7395	1.093387		
Total	120	1937.536			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.085092	0.099993	0.85098	0.396549	-0.11297	0.283159
Mkt-RF	0.853544	0.027583	30.94434	1.37E-57	0.798907	0.908181
SMB	0.13157	0.047509	2.7694	0.006549	0.037465	0.225676
HML	0.168595	0.050504	3.33826	0.001137	0.068557	0.268634
RMW	0.193151	0.076205	2.534643	0.0126	0.042205	0.344098
CMA	0.060972	0.084776	0.719209	0.473471	-0.10695	0.228897

Table 7. Eventide Gilead N

Excess return on Mutual fund regressed on FF-5 factors on 8/2008 through 6/2015

Regression Statistics	
Multiple R	0.915143
R Square	0.837487
Adjusted R Square	0.826934
Standard Error	2.359213
Observations	83

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	5	2208.585	441.7171	79.36147	6.06E-29
Residual	77	428.5734	5.565888		
Total	82	2637.159			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.787489	0.280884	2.803611	0.006392	0.228178	1.346799

Mkt-RF	0.867696	0.070252	12.35111	6.02E-20	0.727805	1.007586
SMB	0.361922	0.125895	2.874788	0.005225	0.111233	0.612611
HML	-0.41487	0.13547	-3.06242	0.003024	-0.68462	-0.14511
RMW	-0.82106	0.19151	-4.28728	5.19E-05	-1.2024	-0.43971
CMA	-0.13009	0.23083	-0.56359	0.574671	-0.58973	0.329547

Table 8. LKCM Aquinas Value

Excess return on Mutual fund regressed on FF-5 factors on 07/1986 through 6/2015

Regression Statistics	
Multiple R	0.949968
R Square	0.902439
Adjusted R Square	0.900496
Standard Error	1.388623
Observations	257

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	5	4476.976	895.3951	464.3506	1.3E-124
Residual	251	483.9967	1.928274		
Total	256	4960.972			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-0.29672	0.093039	-3.18925	0.001608	-0.47996	-0.11349
Mkt-RF	1.014736	0.023735	42.75243	3.2E-117	0.967991	1.061482
SMB	-0.00134	0.031579	-0.04244	0.966181	-0.06353	0.060852
HML	0.338152	0.042004	8.05047	3.31E-14	0.255426	0.420877
RMW	0.214365	0.046446	4.615364	6.27E-06	0.122891	0.305838
CMA	0.050726	0.059809	0.848127	0.397175	-0.06707	0.168518

6. Limitations

First, it is hard to detect abnormal performance when it exists, particularly for a fund whose style characteristics differ from those of the bench mark portfolio based on five-factor-Fama-French model. Second, if abnormal performance is short-lived (say, less than a year), the seven year results shown in Table 2 may overstate the gains. Manager's profit opportunities are more likely to be short-lived.

7. Recommendations for Further Research

This study used Fama-French-five-factor-model (2013) as the primary risk model. Other researchers may explore variants of this model, study a large number of different categories of funds for different time periods, and use data without any survivorship bias.

8. Conclusion

Common wisdom holds that the more restrictions a fund has, the more difficult it is for it to consistently perform well. This just might turn out to be a successful investing strategy. This study explores whether an equally weighted fund of religious funds, has delivered superior results despite its restrictive screens. Active management must produce returns

large enough to offset its higher risks and fees. General consensus of investors is that managers who described themselves as active did not deserve that title, as they did little more than track an index.

A five-factor Fama-French model is utilized to capture the size, value, profitability, and investment patterns in average mutual fund returns and the resulting alpha estimate is compared to the results from 1,000 bootstrap simulations of the cross-section. The returns of the funds in a simulation run have the properties of actual fund returns, except we set true α to zero in the return population from which simulation samples are drawn. The simulations thus describe the distribution of "α" estimates when there is no abnormal performance in fund returns.

The 't' statistic of 2.088157 of the actual estimated alpha of 0.155739 percent per month or 1.8689 percent per year, has a percent rank of 98.3166and as such the equally weighted fund exhibits skill. The fact that equally weighted fund almost beats the simulations does suggest that by picking the right funds, there is high probability that investors can outperform the market.But the problem continues to be that the good funds can't be separated from the lucky bad ones that land in the top percentiles.

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