Investing in the Healthcare Sector: Mutual Funds or ETFs

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Abstract

This study examines the performance of 145 healthcare mutual funds and 44 ETFs over the past four decades. Extending the literature in both sample size and scope of issues, this paper seeks to provide investors and financial advisors with valuable practical guidance. Findings of this study show that both healthcare funds and ETFs on average provide positive alpha to investors, with healthcare funds outperforming ETFs. We further show that healthcare funds and ETFs provide a diversification benefit, such that a hybrid fund of healthcare funds or ETFs with the *S&P* 500 index outperforms the *S&P* 500 alone.

Key words: Healthcare, Mutual Funds, Exchange-traded Funds, Alpha, Returns

1. Introduction

The healthcare sector is growing as a result of the ageing baby boomer population and the advent of the Patient Protection and Affordable Care Act, commonly referred to as "Obamacare." As a result, the conventional wisdom is that investing in the healthcare sector may generate higher returns than investing in a general market index such as the S&P 500. In fact, according to Fidelity Outlook, the health care industry is one of the top sectors targeted for growth in 2016 and because of the projected growth they consider it a defensive sector. For advisors and individual investors, both healthcare mutual funds and healthcare exchange-traded-funds (ETFs) serve as cost-effective investment vehicles. Healthcare funds are actively managed mutual funds that invest in equities of healthcare-related businesses such as hospital operators, pharmaceuticals, medical equipment manufacturing, and bio-tech research. ETFs are funds traded on stock exchanges. These healthcare ETF generally track the performance of an index composed of U.S. equities in the healthcare sector and as a result are much more specific in the nature of their investments than their mutual fund counterparts.

Do healthcare funds and ETFs provide a higher risk-adjusted return? There is a very limited body of studies on the performance of healthcare funds. Examining 13 healthcare funds over the sample period of 1989-1992, Khorana and Nelling (1997) find that these funds outperform the S&P 500 index with an average alpha of 0.75 and an average beta of 1.17. The average Sharpe ratio from these funds is 0.18, higher than 0.06 for the S&P 500 index. Dellva, DeMaskey, and Smith (2001) examine data from the Fidelity healthcare sector fund between 1981 and 1998 and find that the sector fund outperforms the S&P 500 index over the five-year average period. Kaushik, Pennathur, and Barnhart (2010) examine healthcare fund data from the Center for Research in Securities Prices (CRSP) over the period of 1990-2005 and find that healthcare mutual funds

generate a positive average alpha in a four-factor model. More recently, Kaushik, Saubert, and Saubert (2014) investigate the performance of a sample of healthcare mutual funds in the Morningstar database. They find a positive average alpha of 0.29% and an average beta around 0.70. However, they find no evidence of persistence in the performance for funds in the sample.

When compared to traditional mutual funds, ETFs have a lower expense ratio. In addition, ETFs are generally more tax-efficient since the only taxable events are dividends and investor generated sales. According to the Investment Company Institute (ICI), the ETF market reached $1.974 trillion in 2014 and is expected to continue to grow rapidly driven by the high demand from both advisors and investors.[1] The ICI estimates that 5.2 million U.S. households held ETFs in mid-2014. Buetow and Henderson (2009) find that ETFs closely track their benchmark index. Because ETF returns include implementation costs and the benchmark index returns do not, they suggest that it more appropriate for advisors and investors to evaluate a manager's performance by using ETF returns vis-à-vis benchmark index returns. Prather et al. (2009) show that the Standard and Poor's depository receipts (SPDR) is more cost-effective than the low-cost S&P 500 index funds, even after adjusting for the bid-ask spread in the SPDRs. Because of these advantages, several studies have shown that advisors and investors can use ETFs as a tool to exploit some well-known market anomalies, e.g., Chu et al. (2007), Grossmann and Beach (2010), and Chen and Chua (2011).

This study examines the performance of healthcare funds and ETFs in the CRSP mutual fund database over the past four decades. By extending the literature in both sample size and scope of issues, this paper seeks to provide investors and financial advisors with valuable practical

[1] https://www.ici.org/etf_resources/background/faqs_etfs_market.

guidance. Specifically, the following questions are investigated. First, how are healthcare funds different from healthcare ETFs in terms of delivering a positive alpha? Second, how much difference is there in the betas between healthcare funds and healthcare ETFs? Third, which vehicle is more effective in providing diversification within the healthcare sector? Fourth, how much do healthcare funds and healthcare ETFs provide a hedge against a bear systematic risk? Finally, to what extent can advisors and investors gain by diverting a portion of the holdings in the S&P 500 index fund into either a value-weighted healthcare fund portfolio or a value-weighted healthcare ETFs?

The remainder of the paper is organized as follows. Section 2 discusses data and develops testable hypotheses. Section 3 presents empirical results. Discussions and conclusions are in Section 4.

2. Data and Testable Hypotheses

2.1 Data

We use the Lipper objective code "H" as the screening tool to select healthcare sector funds and ETFs from the CRSP mutual fund database. The data is up to the 3rd quarter of 2015. We exclude leveraged funds, variable insurance account funds, and international funds as well as index funds. The final sample contains 145 healthcare mutual funds and 44 ETFs, out of which 20 funds and 16 ETFs are defunct/inactive. We define a fund or ETF as defunct/inactive if its last record date is before the end of sample period, i.e., September of 2015.

Monthly net returns and total net asset value (TNA) for all funds and ETFs in the sample are obtained. Longevity of a fund is measured by the number of months between the first date in the CRSP mutual fund database and the end of sample period of September 2015. Monthly returns for the S&P 500 index are calculated as the logarithmic difference of the index level. Monthly

stock market volatility is measured by *VIX*, the implied volatility of the S&P 500 index options using the Chicago Board Options Exchange. The Fama-French three factors as well as the momentum factor and monthly risk-free rate are obtained from Kenneth French Data Library website.

Panel A in Table 1 shows the summary statistics. The average monthly return for all healthcare mutual funds over the whole sample period is 0.78%, which is higher than the average S&P 500 index monthly return of 0.62% as shown in Panel E in Table 1. Variations are large in terms of both TNA and longevity, indicating a dynamic industry with frequent exit and entry. Panel B in Table 1 shows a similar pattern of large variations in TNA and longevity for the sample of ETFs. Notice that the average monthly return from the ETFs is 0.91%, higher than that from the mutual funds. The standard deviation of returns is larger for ETFs than for mutual funds. However, the range of returns is smaller for ETFs than for mutual funds.

Panel C in Table 1 presents the return statistics for a value-weighted healthcare fund portfolio. Because healthcare ETFs were introduced in June of 2000, the whole sample is divided into two sub-periods, i.e., pre-ETF subsample and post-ETF subsample. For the whole sample period, the average monthly return for the portfolio is 1.36%. But it seems there is a decrease in the returns after the introduction of healthcare ETFs. For example, the average monthly return is 1.85% in the pre-ETF period but only 0.98% in the post-ETF period. Recent changes in the healthcare industry such as more government regulation and other market forces may be causing such a change in the returns. As for healthcare funds, a value-weighted portfolio consisting of healthcare ETFs is also created and its average monthly return is shown in Panel D in Table 1. It is surprising to see that the average ETF-portfolio monthly return is 0.89% lower than the value-weighted healthcare fund return of 0.98% during the same period. Nevertheless, a comparison of

data in Panels C and D shows that the range of returns is still smaller for the ETF portfolio. This might be attributed to the targeted nature of the ETF investments.

Panel E in Table 1 shows the statistics for other variables over the sample period. The average monthly return for the S&P 500 index is lower than the average return of the fund portfolio and that of the ETF portfolio. However, after adding back the risk-free rate to the market-risk-premium, the average return for the value-weighted CRSP stock market index is higher than that for healthcare ETF portfolio. The standard deviation of returns from both healthcare portfolios is lower than that of the S&P 500 index returns. Thus, the total risk of investing in portfolios of healthcare funds or ETFs is lower than that of investing in the S&P 500 index fund.

Finally, Panel F presents correlation coefficients between the variables. The correlation coefficient between the healthcare fund portfolio returns and ETF portfolio returns is only 0.87, which is not too surprising given that mutual funds are actively managed and ETFs are designed to track an index. The correlation coefficient between fund portfolio returns and the S&P 500 index returns is only 0.67. Similarly, the correlation coefficient between the healthcare ETF portfolio returns and the S&P 500 index returns is 0.72. Thus, advisors and investors can achieve more diversification by holding the S&P 500 index fund and a separate healthcare fund portfolio or the healthcare ETF portfolio. Returns from both the healthcare portfolios and the stock market benchmarks are negatively correlated with stock market volatility.

2.2 Testable Hypotheses

Do healthcare funds generate any positive abnormal returns? Theoretically, firms in the healthcare sector are generally engaged in activities that are beneficial to the public. While they are obviously for profit firms, the result of their activities may be seen as lifestyle enhancing and even benevolent by the public. As a result, healthcare stocks may not be the so-called sin stocks.

Fabozzi, Ma, and Oliphant (2008), and Hong and Kacperczyk (2009) show that firms engage in the production or service of certain goods such as firearms, alcoholic beverages, gambling, tobacco etc. earn higher abnormal returns. They label these stocks as sin stocks. They attribute the abnormal returns to the fact that some investors and advisors who are bound by the investment statements under which they invest shun away from these sin stocks because of religious, social, and ethical considerations.

There are two arguments for a positive alpha with respect to healthcare investments. If managers of healthcare funds develop special knowledge, insight to company developmental activities and skills, these funds may enjoy a positive alpha. On the other hand, the well-known efficient market hypothesis stipulates that fund managers may not be able to consistently outperform the overall market to generate a positive alpha. Four previous studies, i.e., Khorana and Nelling (1997), Dellva, DeMaskey, and Smith (2001), Kaushik, Pennathur, and Barnhart (2010), and Kaushik, Saubert, and Saubert (2014), all find a positive alpha for healthcare mutual funds over various sample periods. The following two models are used to test the existence of a positive alpha in healthcare mutual funds and ETFs. In the single factor model, the S&P 500 index returns are used as a proxy for the market returns.

$$R_{i,t} - R_{f,t} = \alpha + \beta_1\left(R_{sp,t} - R_{f,t}\right) + e_{i,t} \quad (1)$$

where $R_{i,t}$ is the monthly return from the healthcare funds or ETFs and $R_{f,t}$ is the one-month Treasury bill rate. $R_{sp,t}$ is the monthly return from the S&P 500 index.

$$R_{i,t} - R_{f,t} = \alpha + \beta_1 MRP_{m,t} + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 MOM_t + e_{i,t} \quad (2)$$

In the four-factor model below, $MRP_{m,t}$*is* the market risk premium, i.e., the excess return of the CRSP value-weighted market benchmark returns over the risk-free rate. SMB_t is the size factor, HML_t is the value factor, and MOM_t is the momentum factor.

Abnormal Return Hypothesis: Healthcare funds or ETFs do not generate a positive average alpha, i.e., H_0: $\bar{\alpha} \leq 0$.

Can advisors and investors holding an all-stock portfolio such as the S&P 500 index fund achieve more effective diversification by shifting some portion of their investment into healthcare funds? Healthcare funds or ETFs can be a diversification tool if their betas are lower than the beta of a market portfolio, which is one. Thus, we test the following hypothesis.

Diversification Hypothesis: Healthcare funds and ETFs provide no diversification benefits, i.e., H_0: $\bar{\beta}_1 \geq 1$.

It seems that healthcare is not cyclical and may be considered a defensive sector against market downturns since peoples' need for medicine and medical care is not changed by an economic downturn; though there may be a tendency to attempt to cut back these expenses in a prolonged downturn or a reduction in governmental supplemental spending support for healthcare or insurance. If in fact the healthcare sector is defensive, both advisors and investors may hold healthcare funds or ETFs as a hedge against a bear market risk. Thus, the model in Equation 3 is used to test the bear market risk hedge hypothesis.[2]

$$R_{p,t} - R_{f,t} = \alpha + \beta_1 Bear_t + \beta_2 VIX_t + \beta_3 Obamacare_t + e_{i,t} \qquad (3)$$

Where the dependent variable is the monthly excess return from either the value-weighted healthcare fund portfolio or ETF portfolio. *Obamacare* is a dummy variable that takes a value of

[2] As in Khorana and Nelling (1997), we find no significant relation between the inflation rate in the U.S. and healthcare fund and ETF returns. For brevity, they are not reported in the paper, but they are available upon request.

one after its implementation in March 2010 and zero otherwise. *Bear* is a dummy variable that takes a value of one if the monthly S&P 500 index return is negative and zero otherwise. VIX_t is the change in the VIX index - a measure of implied volatility in the S&P 500. As discussed by Hillier, Draper, and Faff (2006), investors may flock to safe investment vehicles such as precious metals during periods of high stock market volatility. We add this volatility variable to test if healthcare stocks are also considered as a safe harbor.

Inflation Hedge Hypothesis: Healthcare funds provide no hedge against a bear market risk, i.e., H_0*:* $\beta_2=0$*.*

Finally, we test if an all-stock portfolio such as the S&P 500 index fund can earn a higher risk-adjusted return by adding healthcare funds to the holdings. Conover et al. (2009) show that investors achieve a higher average return and lower standard deviation by forming a portfolio composed with U.S. equities and precious metal equities (at 5%, 10%, and 25% levels) than holding an all-stock U.S. equity portfolio.

Investment Strategy Hypothesis: A hybrid portfolio with healthcare funds or ETFs and the S&P 500 index fund does not outperform the traditional strategy of buy-and-hold the S&P 500 index fund.

In this study, we use weights at 5% and 10% levels in the value-weighted healthcare fund portfolio and the healthcare ETF portfolio. Given the fact the S&P 500 index already includes large pharmaceutical and bio-tech firms, a larger exposure to the healthcare funds or ETFs may be excessive.

3. Results

3.1 Alpha and Beta

As shown in Table 2 Panel A, we first conduct a pooled regression to estimate single-factor and the four-factor models. The single factor model alpha is 0.5465%, which is significant at the 0.01 level. This alpha estimate is smaller than the average alpha estimate in Khorana and Nelling (1997) who employ pre-ETF data. The smaller alpha is consistent with the downward trend in the returns over the pre and post-ETF subsample periods reported in Table 1. Therefore, the smaller alpha size can be explained by the sample difference reflecting change in the underlying economic factors. Similarly, the average alpha from the four-factor model is 0.2797% and is also significant at the 0.01 level. Comparing with the alpha estimate of 0.2473% in Kaushik, Saubert, and Saubert (2014), our alpha estimate from the four-factor model is slightly higher.

We then estimate alpha for the individual funds with at least 25 months of data. The average alpha from the individual fund regressions is 0.4375% in a single-factor and 0.24% in the four-factor models. Because all alpha estimates in Panel A are significantly positive, we reject the null hypothesis that these healthcare funds do not produce a positive alpha.

Table 2 Panel A shows an average market beta of 0.71 from the pooled regression of a single-factor model and the four-factor model. This estimate is much lower than the estimate of 1.17 in Khorana and Nelling (1997). As discussed in the previous paragraph, the difference in the magnitude of market beta can be attributed to the difference or consistence in the sample periods between ours and theirs. Our estimate of the market beta is very close to the magnitude of 0.70 reported in Kaushik, Saubert, and Saubert (2014). Also shown in Panel A, the average beta from the individual fund regression of either the single-factor model or the four-factor model is also 0.71. Because these healthcare funds have a positive alpha and a beta less than one, adding healthcare funds may provide more diversification for advisors and investors who currently hold the S&P 500 index fund.

Panel B provides the breakdown of alphas from individual fund regressions. Not every fund is generating a positive alpha. Only about 25% of the funds generate a significantly positive alpha, i.e., significant at the 0.05 level, in the single-factor model and about 10% of them do in the four-factor model. Most of the healthcare funds have a zero alpha, i.e., an alpha value statistically insignificant from zero at the 0.05 level.

Panel C provides an update on the operational status for the funds with a positive alpha. If a fund is still in operation at the end of the sample period, it is classified as on-going and otherwise as defunct or inactive. Not surprisingly, all funds with a positive alpha are still in operation – regardless of which model is used to estimate the risk-return relation.

Table 3 presents results for healthcare ETFs. The alpha from the pooled regression is 0.7737% in the single-factor model and 0.4710% in the four-factor model. These alphas are much higher than those for the funds as reported in Table 2 Panel A. The average alpha from the individual ETF regressions is 0.9115% in the single-factor model and 0.6314% in the four-factor model, both of which are also higher than those of healthcare funds. The magnitude of market beta from these healthcare ETFs is also higher than that from the healthcare funds. Thus, these healthcare ETFs have a higher systematic risk than the healthcare funds.

As shown in Panel B in Table 2, majority of the ETFs deliver a significantly positive alpha. Not surprisingly, Panel C shows that all ETFs with a positive alpha are still in operation at the end of the sample period.

3.2 Healthcare Funds and ETFs as a Hedge against a Bear Market

As shown in Table 4, in the value-weighted healthcare fund portfolio, the coefficient for the dummy variable *Bear* is significantly negative. Similarly, for the healthcare ETF portfolio, the coefficient for the dummy variable *Bear* is also significantly negative. Thus, one rejects the null

hypothesis that healthcare funds and ETFs provide a no hedge against downturns in the stock market. Even though it is highly regulated by the governments at the Federal and State levels, health care may also exhibit some characteristics as a necessity good. As a result, healthcare sector is not completely counter cyclical to economic fluctuations.

As shown in Table 4, the coefficient for stock market volatility is insignificant in Model 1 for both regressions. Therefore, there is no evidence that healthcare funds generate any better performance during more volatile stock market months than during low volatile months. Another interesting result in Table 4 is the fact that the coefficient for the Obamacare dummy variable is insignificant in all models. Thus, there is no evidence that healthcare funds or ETFs get a bump from the Obamacare legislation. However, it is important to note that the Obamacare is still very young and has not been fully implemented. As the Obamacare program is rolled out and participation continues to increases, we may detect a significant effect in the future, hence this finding clearly leaves a door open for future research.

In Model 2 in Table 4, we replace the variable *Bear* with the S&P 500 index return. We test whether healthcare funds and ETFs deliver a high return during volatile stock market periods. It is still plausible that advisors and investors consider healthcare sector less risky than the other sectors as the stock market gets very volatile. One can still use healthcare sector as a safe harbor to conserve capital. But can investors earn a higher return, more than simply preserve capital? After controlling for stock market returns and the effect from the Obamacare, the coefficient for the variable *VIX* is insignificant. Thus, the evidence in Table 4 shows that investors simply cannot rip positive returns by investing in healthcare funds or ETFs during volatile stock market periods even though they still use the healthcare sector as a safe harbor to preserve capital.

3.3 Diversification Benefits from Healthcare Funds and ETFs

Do healthcare funds deliver a higher return than the healthcare ETFs? Model 1 in Table 5 presents a simple comparison of the returns from two healthcare portfolios. As can be seen, the value-weighted healthcare fund portfolio has a higher return than the value-weighted healthcare ETF portfolio. In Model 2, several control variables are added. Again, after adjusting for market downturns, stock market volatility, and the passing of the Obamacare legislation, the healthcare fund portfolio still has a higher return than the ETF portfolio. Panel F in Table 1 shows that healthcare funds are correlated less with the market portfolio, are influenced less by volatility, and subsequently have lower beta values relative to ETFs, hence the diversification benefit. These findings reveal that the active management of healthcare funds does offer an advantage over the passive approach of ETFs. In general, the empirical evidence suggests that managers of healthcare funds tend to constructor portfolios that are more efficient than a portfolio tracking broad market exposure.

Can better investment outcomes be achieved by adding healthcare funds or ETFs into the portfolio? As shown in Table 6 Panel A, the baseline portfolio is an all-stock portfolio, i.e., 100% invested in the S&P 500 index fund. Table 6 Panel B shows that the performance from the two enhanced strategies involving the value-weighted healthcare fund portfolio. The first enhanced portfolio (5%HC portfolio) has a weight of 5% in the value-weighted healthcare fund portfolio and 95% in the S&P 500 index fund. The 5%HC portfolio has not only a higher mean return but also a lower standard deviation. Similarly, the 10%HC portfolio witnesses an increase in the mean return and a decrease in the standard deviation of returns. As shown in Panel C, the results are very much the same for the two enhanced portfolios with a 5% and a 10% exposure toward the healthcare ETF portfolio. The enhanced portfolios have a higher return and a lower standard deviation than the baseline S&P 500 index fund.

As shown in Figure 1, all four enhancement strategies have a higher Sharpe ratio than the baseline all-stock portfolio. The 10%ETF portfolio also has the higher Sharpe ratio. These results support the argument that an increased exposure to the healthcare sector is a value-enhancing move.

Panel D provides statistical tests on the return difference between the baseline portfolio and the enhanced portfolios. Uniformly, the enhanced portfolios with positive tilting towards the healthcare funds or ETFs all have a higher return than the baseline portfolio.

To illustrate the economic significance from the positive tilting towards healthcare funds or ETFs, the terminal values of a hypothetical initial investment of $1 from the five strategies are calculated and shown in Figure 2. The 5%HC portfolio produces a terminal value that is 8% higher than that from the baseline strategy of buy-and-hold the S&P 500 index fund. The 10%HC fund portfolio produces a terminal value that is 17% higher than the terminal value from the baseline strategy. The other two enhanced portfolios involving healthcare ETFs are also producing a higher terminal value than that from the baseline strategy, but not as high as the two portfolios involving with healthcare funds. Therefore, it is quite economically significant to take advantage of a positive alpha and a relatively low beta offered by the healthcare funds.

4. Discussion and Conclusion

An examination of 145 healthcare mutual funds and 44 healthcare ETFs in the CRSP database shows a significantly positive average alpha and a low average beta for these healthcare funds and ETFs. This, these healthcare funds and ETFs offer both the benefit of low systematic risk and more diversification.

It is found that healthcare funds provide a hedge against a bear market risk but not against a volatile stock market. It is shown that the investment results of holding an all-stock portfolio such as the S&P 500 index fund can be improved, resulting in both a higher return and a lower

standard deviation by simply adding a value-weighted healthcare portfolio to the original holdings. At either 5% or 10% exposure, the two enhanced portfolios both have a higher Sharpe ratio than the traditional S&P 500 index fund.

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Table 1. Summary Statistics

	Mean	S.D.	Min.	Max.
Panel A. Healthcare Mutual Funds				
R_{hc} (%)	0.78**	5.53	-35.98	66.02
TNA ($ million)	473.74	2,020.65	0.01	20,010.40
Maturity	62.26	61.91	00	231
Panel B. Healthcare ETFs				
R_{etf}	0.91**	5.56	-22.17	24.73
TNA ($ million)	569.96	992.58	0.10	10,035.50
Maturity	99.63	51.47	5.00	171
Panel C. Value-weighted Healthcare Fund Portfolio Returns				
Whole sample	1.36**	4.83	-17.09	17.47
Pre-ETF subsample	1.85**	5.53	-17.09	17.47
Post-ETF subsample	0.98**	4.21	-15.51	11.26
Panel D. Value-weighted Healthcare ETF Portfolio Returns				
	0.89*	5.10	-13.46	13.54
Panel E. Market Parameters				
R_{rf}	0.25**	0.20	0.00	0.71
R_{sp}	0.62**	4.17	-18.56	10.58
MRP	0.66**	4.23	-17.23	11.35
HML	0.21	3.07	-13.11	13.91
SMB	0.23	3.24	-16.70	22.32
MOM	0.61*	4.84	-34.58	18.38
VIX	19.77**	7.73	10.82	62.64

Panel F. Correlation Coefficients

	$R_{p,etf}$	R_{sp}	*VIX*	R_{rf}	MRP	SMB	HML	MOM
$R_{p,hc}$	0.87**	0.67**	-0.20**	0.08	0.71**	0.28**	-0.33**	0.003
$R_{p,etf}$		0.72**	-0.24**	-0.05	0.73**	0.33**	-0.16*	-0.27*
R_{sp}			-0.27**	0.05	0.98**	0.08	-0.18**	-0.26**
VIX				-0.13*	-0.25**	-0.06	-0.14*	-0.08
R_{rf}					-0.00	-0.06	0.03	0.09
MRP						0.22**	-0.26**	-0.23**
SMB							-0.33**	0.06
HML								-0.17**

Note: The sample contains monthly net return for 145 healthcare mutual funds (R_{hc}) and 44 ETFs (R_{etf}) and total net assets value (TNA) in millions of dollars in the CRSP survivor-bias-free US mutual fund database. *Maturity* is a fund's number of months in operation. $R_{p,hc}$ and $R_{p,etf}$ are monthly returns for a total net asset value weighted portfolio for healthcare funds and healthcare ETFs. Pre-ETF subsample is for the period before July 2000 and post-ETF subsample is the period afterwards. R_{sp} is the S&P 500 index monthly return. *VIX* is the implied volatility from the S&P 500 index options on the Chicago Board Options Exchange. MRP, HML, and SMB are Fama-French three factors, MOM is the momentum factor and R_{rf} is the monthly risk-free rate. ** and * indicate significance levels of 0.01 and 0.05, respectively.

Table 2. Abnormal Returns from Healthcare Funds

	Single-factor Model	Four-factor Model
Panel A. Mean and Distribution of Alphas		
Pooled Regressions		
Alpha	0.5468**	0.2797**
	(0.0484)	(0.0443)
MRP	0.7121**	0.7122**
	(0.0110)	(0.0111)
HML		-0.2493**
		(0.0143)
SMB		0.2749**
		(0.0138)
MOM		0.1155**
		(0.0085)
Individual Regressions		
Alpha	0.4379**	0.2400**
	(0.0513)	(0.0396)
Beta	0.7217**	0.7007**
	(0.0219)	(0.0208)
Panel B. Breakdown of Alphas from Individual Fund Regressions		
Positive	22	9
Negative	0	0
Insignificant	69	82
Panel C. Surviving Status of Funds with a Positive Alpha		
On-going	22	9
Defunct	0	0

Note: *Alpha* is the constant and beta is β_1 in the estimation of the risk-return relation from a single factor model with the S&P 500 Index as the market benchmark, i.e., $R_{i,t} - R_{f,t} = \alpha + \beta_1(R_{sp,t} - R_{f,t}) + e_{i,t}$, and the four-factor model below, i.e., $R_{i,t} - R_{f,t} = \alpha + \beta_1(R_{m,t} - R_{f,t}) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 MOM_t + e_{i,t}$. In Panels A & B, the number of alphas/betas significantly positive or negative at the 0.05 level at the individual fund regression is also shown. Panel C and Panel D show the operational status of funds with either a positive alpha or a negative alpha. If a fund is still in operation at the end of the sample period of September, 2015, it is classified as on-going, and defunct otherwise. In parentheses are standard errors. ** indicates significance level of 0.01.

Table 3. Abnormal Returns from Healthcare ETFs

	Single-factor Model	Four-factor Model
Panel A. Mean and Distribution of Alphas		
Pooled Regressions		
Alpha	0.7737**	0.4710**
	(0.1002)	(0.0962)
MRP	0.8751**	0.8584**
	(0.0230)	(0.0244)
HML		-0.3110**
		(0.0419)
SMB		0.3720**
		(0.0452)
MOM		0.0332
		(0.0214)
Individual Regressions		
Alpha	0.9115**	0.6314**
	(0.1093)	(0.0951)
Beta	0.8945**	0.8656**
	(0.0318)	(0.0748)
Panel B. Breakdown of Alphas from Individual ETF Regressions		
Positive	10	8
Negative	0	0
Insignificant	3	5
Panel C. Surviving Status of ETFs with a Positive Alpha		
On-going	10	8
Defunct	0	0

Note: Only funds with sufficient observations (at least 25 months) are analyzed. *Alpha* is the constant and beta is β_1 in the estimation of the risk-return relation from a single factor model with the S&P 500 Index as the market benchmark, i.e., $R_{i,t} - R_{f,t} = \alpha + \beta_1(R_{sp,t} - R_{f,t}) + e_{i,t}$, and the four-factor model below, i.e., $R_{i,t} - R_{f,t} = \alpha + \beta_1(R_{m,t} - R_{f,t}) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 MOM_t + e_{i,t}$. In Panels A & B, the number of alphas/betas significantly positive or negative at the 0.05 level at the individual fund regression is also shown. Panel C and Panel D show the operational status of funds with either a positive alpha or a negative alpha. If a fund is still in operation at the end of the sample period of September, 2015, it is classified as on-going, and defunct otherwise. In parentheses are standard errors. ** and * indicate significance levels of 0.01 and 0.05, respectively.

Table 4. Healthcare Funds and ETFs as a Hedge against a Bear Market Risk

	Healthcare Funds		Healthcare ETFs	
	Model 1	Model 2	Model 1	Model 2
Constant	3.5234**	0.7144	3.6529**	0.1920
	(0.6658)	(0.6019)	(0.8736)	(0.7911)
Bear	-4.8577**	n/a	-5.9146**	n/a
	(0.4913)		(0.6382)	
VIX	-0.0463	-0.0039	-0.0446	0.0157
	(0.0309)	(0.0274)	(-1.22)	(0.0330)
Obamacare	1.0036	0.6419	1.0847	0.5867
	(0.5633)	(0.4925)	(0.6457)	(0.5651)
Market		0.7459**		0.8308**
		(0.0504)		(0.0642)
Adj. R-squares	0.28	0.45	0.37	0.52
N	301	301	183	183

Note: The sample period is between July 2000 and September of 2015. The dependent variable is the monthly excess return from a value-weighted portfolio of healthcare mutual funds or ETF. *Market* is the excess return from the S&P 500 Index. *Obamacare* is a dummy variable that takes a value of one after the Affordable Healthcare Act of 2010 is effective in April 2010 and zero otherwise. *Bear* is a dummy variable that takes a value of one if the monthly S&P 500 index return is negative and zero otherwise. *VIX* is the change in the VIX index. In parentheses are standard errors. ** and * indicate significance levels of 0.01 and 0.05, respectively.

Table 5. Portfolio Returns: Healthcare Funds vs. ETFs

Panel A. Portfolio Alphas

	Healthcare Funds		Healthcare ETFs	
	CAPM	Four-Factor Model	CAPM	Four-Factor Model
Constant	0.8182**	0.5118**	0.7281**	0.5096**
	(0.2007)	(0.1888)	(0.2647)	(0.2619)
MRP	0.7783**	0.7871**	0.8278**	0.8167**
	(0.0482)	(0.0469)	(0.0600)	(0.0671)
HML		-0.1691**		-0.1638
		(0.0655)		(0.0870)
SMB		0.1279**		0.1404
		(0.0603)		(0.1081)
Mom		0.1322**		0.0594
		(0.0398)		(0.0525)
Adj. R-squares	0.45	0.55	0.51	0.55
N	319	319	183	183

Panel B. A Comparison between Fund Portfolio and ETF Portfolio

	Model 1	Model 2
Constant	0.3495*	1.6370**
	(0.1583)	(0.4554)
R_{ETFs}	0.7207**	0.6559**
	(0.0307)	(0.0373)
Obamacare		0.3622
		(0.3237)
Bear		-0.6641
		(0.3865)
VIX		-0.0554**
		(0.0183)
Adj. R-squares	0.75	0.77
N	183	183

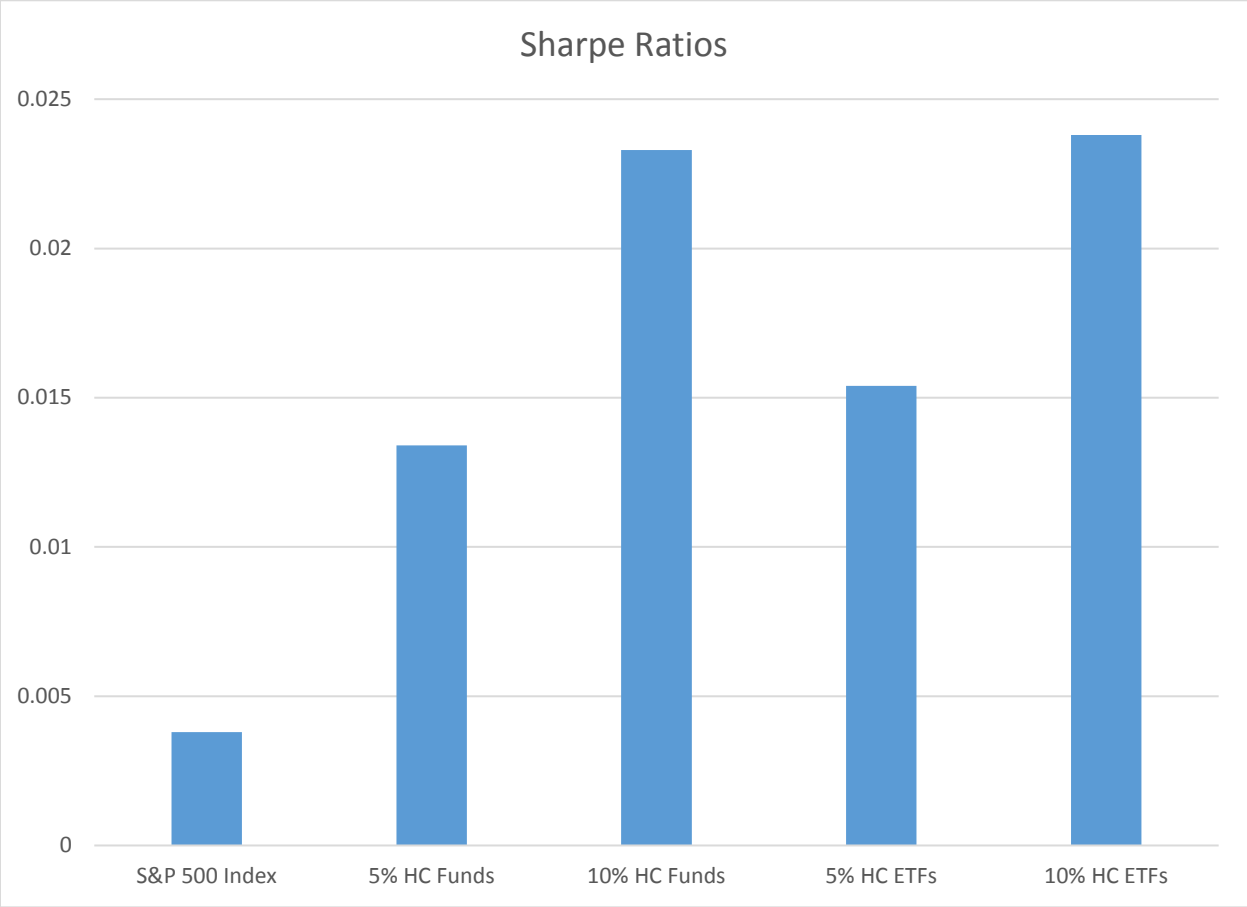
Note: The dependent variable in Panel B is the monthly excess return from a value-weighted portfolio of healthcare mutual funds. R_{ETFs} is the excess return of the value-weighted portfolio of healthcare ETFs. Obamacare is a dummy variable that takes a value of one after the Affordable Healthcare Act of 2010 is effective in April 2010 and zero otherwise. *Bear* is a dummy variable that takes a value of one if the monthly S&P 500 index return is negative and zero otherwise. *VIX* is the change in the VIX index. In parentheses are standard errors. ** and * indicate significance levels of 0.01 and 0.05, respectively.

Table 6. Diversification Effect of Healthcare Funds and ETFs

	Mean (%)	SD (%)
Panel A. Baseline Portfolio		
S&P 500 Fund	0.1517	4.40
Panel B. Diversification from the Healthcare Fund Portfolio		
5% HC Funds	0.1933	4.33
10% HC Funds	0.2349	4.28
Panel C. Diversification from the Healthcare ETFs Portfolio		
5% HC ETFs	0.2026	4.37
10% HC ETFs	0.2387	4.35
Panel D. Performance Difference		
$R_{5\%hc} - R_{sp}$	0.0416^{**} (0.0117)	0.16
$R_{10\%hc} - R_{sp}$	0.0832^{**} (0.0234)	0.32
$R_{hc} - R_{sp}$	0.8316^{**} (0.2336)	3.16
$R_{5\%etf} - R_{sp}$	0.0361^{**} (0.0135)	0.18
$R_{10\%etf} - R_{sp}$	0.0723^{**} (0.0270)	0.36
$R_{etf} - R_{sp}$	0.7226^{**} (0.2699)	3.64

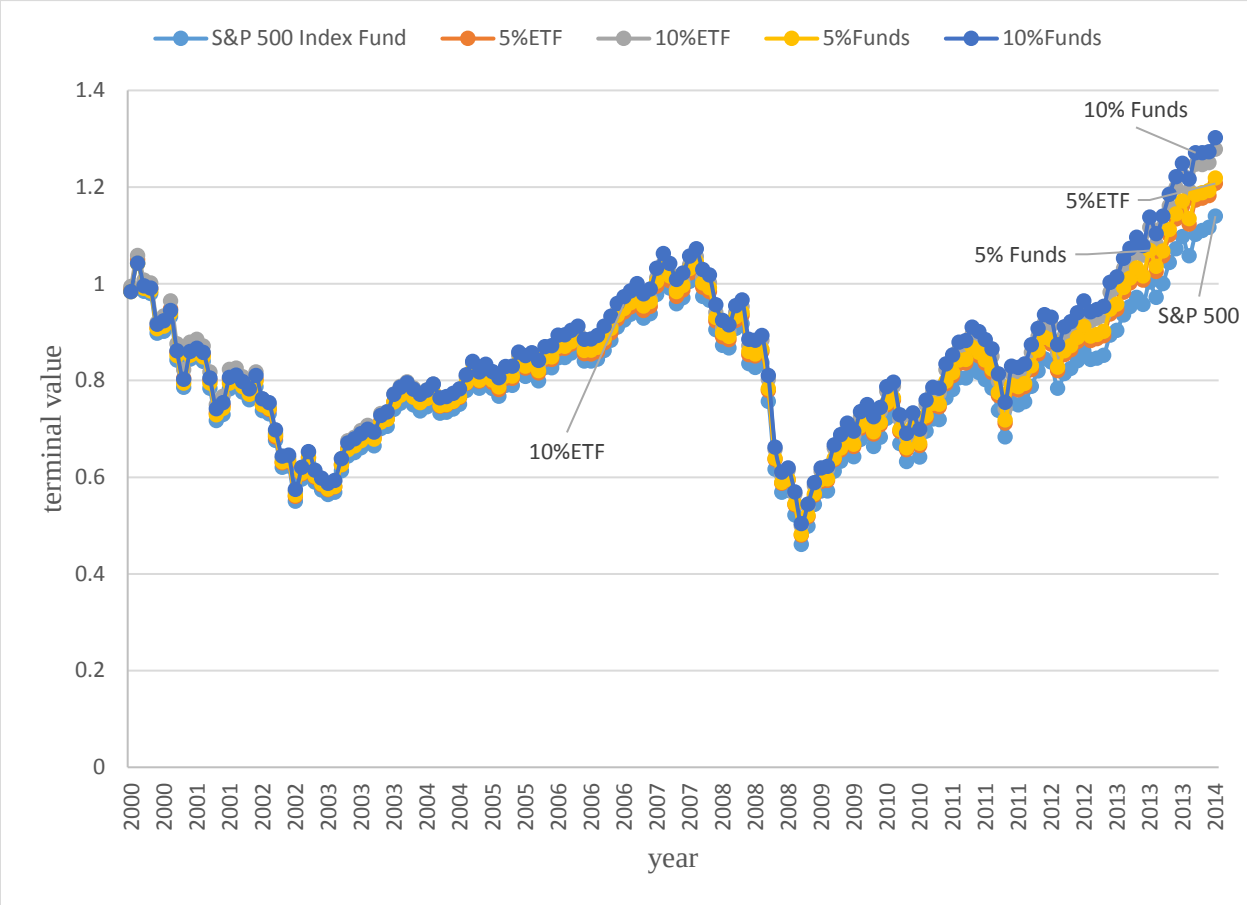
Note: The baseline portfolio is an S&P 500 index fund with zero percent invested in any healthcare funds or ETFs. A value-weighted healthcare funds portfolio and an ETF portfolio is added (5% and 10%) to the S&P 500 index fund to form an enhanced portfolio. The sample period is between July of 2000 and September of 2015. In parentheses are standard errors. ** and * indicate significance levels of 0.01 and 0.05, respectively.

Figure 1. Sharpe Ratios from Investment Strategies with Healthcare Funds and ETFs



Note: This figure exhibits the Sharpe ratios for five strategies. The baseline strategy is the S&P 500 index fund. Strategy of 5%ETF involves a combination of 95% investment in the S&P 500 index fund and 5% investment in the value-weighted healthcare ETFs. Strategy of 5%Funds involves a combination of 95% investment in the S&P 500 index fund and 5% investment in the value-weighted healthcare mutual funds. The sample period is between July 2000 and September 2015.

Figure 2. Terminal Values from Investment Strategies with Healthcare Funds and ETFs



Note: The baseline strategy is the S&P 500 index fund. Strategy of 5%ETF involves a combination of 95% investment in the S&P 500 index fund and 5% investment in the value-weighted healthcare ETFs. Strategy of 5%Funds involves a combination of 95% investment in the S&P 500 index fund and 5% investment in the value-weighted healthcare mutual funds. The sample period is between July 2000 and September 2015.