Using Alternative Investment Vehicles to Replication Hedge Funds Risk and Return

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Abstract

In this paper we will compare the risk return pattern along with the performance measure of hedge funds to alternative investment vehicles, namely the Exchange Traded Funds (ETFs). Our results showed that exchange traded funds can be used to emulate the hedged funds portfolios' risk and return matrix, and performance. Exchange traded funds are required to report their investment strategies to the Security and Exchange Commission. Hedged funds have proprietary investment strategies and do not have to report their investment strategies to the Security and Exchange Commission.

Keywords: hedge fund, ETF, portfolio management, risk, and return

1. Introduction

Exchange tradable Funds have gain popularity among small and large portfolio investors in the last few years because of their low cost, tax efficiency and transparency. A hedge fund is an equity diversified asset class investment that provides higher rate of return adjusted to risk (high positive Alpha) under all economic conditions. Malkiel and Saha (2005) state that hedged fund rates of return are normally distributed. They also reported that hedged funds have several biases such as backfill bias and survival bias (dead funds and defunct funds).

They found the there is no persistence in year over year funds return. Therefore, they concluded that hedged funds are riskier and provide lower returns than what is common. We attempt in this paper to show that investing in Exchange Tradable Funds can replicate the outcome of hedged funs.

2. Literature Review

Liang (2001) reported that hedge funds differ substantially from traditional investment vehicles, such as mutual funds. He also stated that unlike mutual funds, hedge funds follow dynamic trading strategies and have low systematic risk.

Getmansky, Lo, and Makarov (2004) found that the returns on hedge funds and other alternative investments are often highly serially correlated due to illiquidity exposure and smoothed returns. Heusona, Hutchinsonb, and Kumara (2016) found that hedge fund returns exhibit significant skewness and that fund investors prefer skewness. They showed that annual flows into hedge funds with positively skewed returns are 11.5% higher than comparable funds with negatively skewed returns. Agarwal, Ruenzi, and Weigert (2017) examined the impact of tail risk on fund performance to identify the sources of tail risk. They found that tail risk affects the cross-sectional variation in fund returns and that investments in both tail-sensitive stocks and options drive tail risk. They investigated empirically whether uncertainty about equity market volatility can explain hedge fund performance both in the cross section and over time.

Agarwal, Florian and Weigert (2017) measured uncertainty via volatility of aggregate volatility (VOV) and constructed an investable version through returns on lookback straddles on the Chicago Board Options Exchange (CBOE) volatility index, VIX. They find that VOV exposure is a significant determinant of hedge fund returns. After controlling for fund characteristics, they found robust and significant negative risk premium for VOV exposure in the cross section of hedge fund returns. Glosten, L, Nallareddy, S and Zou, Y (2020), investigates the effect of exchange-traded funds' (ETFs') on the short-run informational efficiency of their underlying securities. They reported that ETF activity increases short-run informational efficiency for stocks with weak information environments.

The majority of hedged funds use a Smart Beta investment strategy, which is a portfolio that aims to outperform the capitalization weighted market portfolio. The strategy does this by using alternative weighting methods that emphasize input factors such as variability, volatility, size, value, and momentum. However, Smart Beta strategies portfolios are exposed to several types of risk compared to capitalization weighted indexes that can last for extended periods of time.

The following risk strategies are utilized in Smart Beta strategies: systematic risk (e.g., factor tilts), specific risk (related to the assumptions and inputs of a strategy) and relative risk (i.e., the risk of potentially severe underperformance) compared to capitalization weighted indexes that can last for extended periods of time.

Smart Beta can play an important role in an institutional investors' allocations, but only at the price of implementing a genuine risk-management process.

In comparison with mutual funds, they reported that hedged funds are three to four times higher than mutual funds, Burton G. Malkiel and Atanu Saha (2005).

They found that hedged fund attrition is more than four times higher than mutual funds.

They reported that the higher the standard deviation of return (total risk) of the hedged fund, the lower the probability of survival. They also showed that the survivability of hedged funds depends on its most recent return, but the size of said fund is irrelevant to its survivability.

Keith H. Black (2012) stated that the "explanatory power of the hedge fund factor analysis improves when illiquidity and non-linear exposures are explored. Alternatives betas, such as commodity, currency and credit default swaps, also lead to more accurate estimates of alpha and beta."

There are two major implications of his findings that determine the underlying factor risks borne by their underlying hedge fund.

First, investors can better determine the value added by hedge fund managers and may wish to compensate their managers.

Second, investors who understand the factor risks of their hedge fund portfolio will be better equipped to calculate the factor exposure at the total portfolio level, including both hedge funds and stock & bond investments.

A new challenge to the hedge funds are exchange tradable funds (ETFs), which is a tradable asset class investment vehicle that emulates an index, bonds portfolio, commodities or a combination of all assts. ETFs are traded in all 6 continents and they span throughout 36 countries at a continuously growing rate —making them an important investment vehicle.

Since ETFs are taking on an increasingly prominent role in the securities markets, it is now more important than ever for investors and traders to have an understanding of these investment vehicles and their ability to replicate the risk and return of hedge funds. They also can be utilized to complete portfolio diversification by minimizing benchmark risk with pure exposure to specific areas of the market. ETF portfolios can provide similar exposure to the strategic asset allocation, but with additional liquidity. ETFs can also substitute for futures due to the significant increase in the roll and funding costs of futures.

Exchange tradable funds are used as core allocation. They are fast, convenient, and precise. ETFs provide cost-effective access to a broad variety of market exposures in the strategic core portfolio.

Liquidity management can also be used to invest short-term in the market, while refining a longer-term investment view which can quickly gain beta exposure while search for new managers (transitions).

ETFs are used for rebalancing portfolios such as manage portfolio risk/beta tilts in between rebalancing cycles and are used in lieu of physical delivery of underlying securities possible (in-kind redemption). ETFs are good investment vehicles for investment tactical adjustment to certain over- or underweight asset classes and regions or countries on the basis of short-term views.

Our study will compare and contrast the risk and return of hedge funds and exchange tradable funds. Our results will offer a unique opportunity to learn about investing in ETFs in comparison to hedge funds and will complement findings of other studies by offering a window into simulated, real-life trading and investing.

3. Data

Daily data for the exchange tradable funds prices with complete data from 10/4/2011 to 1/2/2016 were obtained from yohoo.com. Daily and monthly rates of return have been computed for fund prices.

At the time of the research we did not have access to any hedge fund data due to it proprietary nature. Table one was obtained form Burton G. Malkiel and Atanu Saha (2005) "Hedge Funds: Risk and Return" Financial Analyst Journal, Vol. 61, Issue 6 https://doi.org/10.2469/faj.v61.n6.2775

4. Results

Table 1 show the descriptive statistics for Various hedge fund Categories from 1995 to 2003.

Table 1. Descriptive statistics for various Hedge Fund Categories, 1995-2003

Table 1. Descriptive Statistics for Various Hedge Fund Categories, 1995 – 2003								
	Annual		Monthly					
Fund Type	Return	Standard Deviation	Return	Standard Deviation	Sharpe Ratio	Skewness	Kurtosis	J-B Statistic
Convertible arbitrage	11.42%	15.56%	0.86%	1.40%	0.46	-0.50	0.07	63.37*
Dedicated short bias	-0.01	23.82	0.25	5.75	-0.18	0.65	4.15	12.07*
Emerging markets	14.19	44.09	0.71	5.06	0.23	-0.66	5.11	27.90*
Equity market neutral	5.56	13.08	0.57	0.93	0.10	-0.62	4.22	13.70*
Event driven	9.71	17.73	0.83	1.58	0.31	-1.50	10.61	301.00*
Fixed-income arbitrage	7.04	17.70	0.58	1.08	0.16	-2.03	9.16	244.98*
Fund of funds	6.67	15.97	0.51	1.79	0.15	-0.13	6.43	53.19*
Global macro	6.79	24.15	0.38	2.03	0.11	0.09	3.00	0.14
Long-short equity hedge	10.33	29.91	1.01	2.89	0.20	-0.09	4.34	8.26*
Managed futures	7.68	23.22	0.51	2.49	0.15	0.09	2.87	0.23
Other	11.42	29.71	0.75	1.79	0.24	-1.28	8.57	169.06*
Hedge fund Universe	8.82	9.21	0.70	1.99	0.50	-0.25	2.51	29.36*
CSFB	13.41	10.36	1.05	2.45	0.89	0.07	1.90	16.36*
S&P 500	12.38	21.69	0.93	4.70	0.38	-0.64	0.28	7.69*
U.S. T-bill	4.20	1.78	0.34	0.14	0.00	-0.89	-0.80	17.14*

Notes: backfilled data were excluded; live and defunct funds were included. The Sharpe ratio was measured as excess return dividend by standard deviation of return. The J-B (Jarque-Bera) statistic tests the joint hypothesis that skewness = 0 and kurtosis = 3. The Sharpe ratio is based on annual data; kurtosis and skewness are based on monthly.

*Significant at the 5 percent or better level of confidence (critical value = 5.99)

The average annual rate of return ranged from 13.41 to -0.01 percent with standard rang form 44.09 to 13.08 percent. The monthly average rate of return ranged from 1.01 to 0.25 percent with standard deviation rang from 5.7 to 0.93 percent. This indicates a none consistent and return and risk among different hedged funds.

The annual Sharp ratio, the price of one unit of total risk, measured by the excess return divided by standard deviation, which represent total risk, ranged from 0.89 to -0.18 percent. The Sharp ratio is low relative to other investments vehicles.

Skewness of the annual rates of return shows that most of the hedged funds return are negatively skewed which defies why investors invest in the hedge funds and what hedge funds managers claim of superior rate of return relative to risk.

The hedge fund universe annual average rate of return is 8.82 percent with standard deviation of 9.21 percent. The monthly average rate of return is 0.70 percent with standard deviation of 1.99 percent. This shows that on average the hedge fund portfolios to underperform the treasury bill return relative to risk. Investors will be better off investing in treasury bill or risk-free investment.

Table 2. Using annual data Table 2 show the descriptive statistics for Various Exchange Tradable Fund Categories from 10/4/2011 to 1/2/2016

ETF Descriptive Statistics						
The MEANS Procedure						
Variable	Label	N	Mean	Std Dev	Minimum	Maximum
R_S_P	R S&P	1074	-0.000468908	0.0087871	-0.0415170	0.0410309
R_VIX	R VIX	1074	0.0032211	0.0723170	-0.3171602	0.2685248
R_CVOL	R CVOL	1074	0.0087947	0.0626060	-0.2592593	0.3365885
R_IVOP	R IVOP	1074	-0.000769405	0.0238705	-0.2797886	0.3910491
R_SXVY	R SXVY	1074	-0.000456966	0.0418629	-0.1160297	0.2372588
R_TVIX	R TVIX	1074	0.0115552	0.0763277	-0.2719798	0.4245810
R_TVIZ	R TVIZ	1074	0.0045467	0.0394759	-0.1909189	0.2088781
R_UVXY	R UVXY	1074	0.0119011	0.0805343	-0.2702366	0.3635739
R_VIIX	R VIIX	1074	0.0041767	0.0401834	-0.1567861	0.1544007
R_VIIZ	R VIIZ	1074	0.0018694	0.0195162	-0.1146651	0.1070747
R_VIXM	R VIXM	1074	0.0018992	0.0197916	-0.0888984	0.0981767
R_VIXY	R VIXY	1074	0.0041831	0.0400947	-0.1573967	0.1511150
R_VXX	R VXX	1074	0.0041651	0.0399163	-0.1586975	0.1530864
R_VXZ	R VXZ	1074	0.0018752	0.0197752	-0.0926829	0.0894701
R_XVIX	R XVIX	1074	0.000350399	0.0078234	-0.0529412	0.0498443
R_XVZ	R XVZ	1074	0.000873165	0.0097838	-0.1033020	0.0522792
R_XXV	R XXV	1074	-0.000199094	0.0075776	-0.0842077	0.0919507
R_ZIV	R ZIV	1074	-0.000992600	0.0198175	-0.0739910	0.1169659
R_VQT	R VQT	1074	-0.000048224	0.0050968	-0.0222392	0.0188640

The average annual rate of return ranged from 1.19 to 0.00 percent with standard range from 8.05 to 0.05 percent.

Table 3. Using monthly data Table 3 show the descriptive statistics for Various Exchange Tradable Fund Categories from 10/4/2011 to 1/2/2016

Date	R S&P	R VIX	R CVOL	R IVOP	R SXVY	R TVIX	R TVIZ	R UVXY	R VIIX	R VIIZ
Mean	-0.0005	0.0032	0.0088	-0.0008	-0.0005	0.0116	0.0045	0.0119	0.0042	0.0019
VAR	0.0001	0.0052	0.0039	0.0006	0.0018	0.0058	0.0016	0.0065	0.0016	0.0004
SD	0.0088	0.0723	0.0626	0.0239	0.0419	0.0763	0.0395	0.0805	0.0402	0.0195
Skewness	0.1641	-0.2411	0.2462	3.7017	1.1153	0.4081	-0.0119	0.2188	-0.1916	-0.1685
Kurtosis	2.2620	1.6509	2.2514	112.7724	3.6614	2.9855	2.7668	1.5977	1.4726	1.9379
Cov(RM,Retf)	0.0001	-0.0005	-0.0005	0.0000	0.0003	-0.0005	-0.0003	-0.0006	-0.0003	-0.0001
Beta	1.0000	-0.8185	-0.8541	0.2319	0.8314	-0.8020	-0.7352	-0.8271	-0.8347	-0.4814
Sharpe Ratio	-6.0729	0.6159	2.2438	-1.3503	-0.2608	1.9834	2.9176	1.8349	2.5867	4.9080
Treynor Ratio	-0.0005	-0.0039	-0.0103	-0.0033	-0.0005	-0.0144	-0.0062	-0.0144	-0.0050	-0.0039

The average annual rate of return ranged from 1.19 to -0.08 percent with standard rang form 8.05 to 1.95 percent. The annual Sharp ratio ranged from 4.90 to -1.35 percent. The Sharp ratio is comparable to other investments vehicles.

Skewness of the annual rates of return shows that most, more the 50 percent, of the ETF return are positively skewed which is consistent with other investment vehicles. The ETF with negative return and skewness also have negative beta or systematic risk which is consistent with the capital asset pricing model.

Table 4. Using monthly data Table 4 show the descriptive statistics for Various Exchange Tradable Fund Categories from 10/4/2011 to 1/2/2016

Date	R S&P	R VIXM	R VIXY	R VXX	R VXZ	R XVIX	R XVZ	R XXV	R ZIV	R VQT
Mean	-0.0005	0.0019	0.0042	0.0042	0.0019	0.0004	0.0009	-0.0002	-0.0010	0.0000
VAR	0.0001	0.0004	0.0016	0.0016	0.0004	0.0001	0.0001	0.0001	0.0004	0.0000
SD	0.0088	0.0198	0.0401	0.0399	0.0198	0.0078	0.0098	0.0076	0.0198	0.0051
Skewness	0.1641	-0.1685	-0.2076	-0.2113	-0.1884	0.2380	-0.6583	1.3061	0.7244	0.1069
Kurtosis	2.2620	1.9379	1.4288	1.4972	1.8981	5.5184	17.8707	101.8473	3.1484	1.0903
Cov(RM,Retf)	0.0001	-0.0001	-0.0003	-0.0003	-0.0001	0.0000	0.0000	0.0000	0.0001	0.0000
Beta	1.0000	-0.7960	-0.8359	-0.8348	-0.7914	0.1231	-0.4894	0.2186	0.7809	-0.0570
Sharpe Ratio	-6.0729	4.8486	2.6021	2.6141	4.7953	5.7249	9.1218	-3.4674	-2.5274	-1.8564
Treynor Ratio	-0.0005	-0.0024	-0.0050	-0.0050	-0.0024	0.0028	-0.0018	-0.0009	-0.0013	0.0008

The average monthly rate of return ranged from 0.42 to -0.01 percent with standard rang form 4.01 to 0.51 percent. The monthly Sharp ratio ranged from 9.12 to -3.46 percent. The Sharp ratio is comparable to other investments vehicles.

Skewness of the monthly rates of return shows that 4 out of nine ETF funds return to be positively skewed which is consistent with other similar investment vehicles during the period of study. The ETF with negative return and skewness also have negative beta or systematic risk which is consistent with the capital asset pricing model.

Our finding is consistent with the finding of Muhtaseb (2010), he stated that some hedged funds management misrepresentations of their performance should inspire investors in hedge funds and industry stakeholders to demand some form of independent oversight and investigate any special relationship the fund has with a third party, through the due diligence process

Our results showed that exchange traded funds can be used to emulate the hedged funds risk and return matrix and performance. Exchange traded funds are required to report their investment strategies to the Security and Exchange Commission. Hedged funds have proprietary investment strategies and do not have to report their investment strategies to the Security and Exchange Commission. Investing in ETFs enhance efficiency, transparency, accountability.

5. Conclusion

In conclusion, we demonstrate that investing in TEFs fund can immolate the risk return spectrum of hedge fund without the need for taking higher risk, higher management fees and the unknown proprietary investment strategies. One of the major advantages of investing in ETFs is its liquid like stocks. In this paper to show that investing in Exchange Tradable Funds (ETF) can replicate the outcome of hedged funds and that ETF can be used as substitute for hedge funds risk and return outcome at a lower cost, tax efficiency and complete transparency.

The limitation of the paper is use of published hedged funds data. The ability to obtain hedge funds data can shed lights on the benefits of using tradable exchange funds investment to product the hedged fund risk and return matrixes efficiently.

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