Liquid Alternative Mutual Funds Versus Hedge Funds

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Abstract

Despite the rapid rise of the number of liquid alternative mutual funds (LAMFs) available to retail investors in recent years, few studies have compared how their return and risk characteristics differ from their hedge fund counterparts across their entire history. Being among the first comprehensive studies to look at over two decades of LAMF performance, we use risk based factors to compare the performance of LAMFs to hedge funds both in aggregate and broken down by investment styles including equity long-short, market neutral, multi-strategy and managed futures. Overall, we find that LAMFs underperform hedge funds on average by 1-2% per year on a net-of-fee basis when controlling for standard risk factors. These findings provide important implications for investors seeking hedge fund-like returns while considering the importance of liquidity, transparency, and fees as well as for policymakers who have recently proposed imposing derivative position limits on 1940 Act investment vehicles.

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1. Introduction

In this paper, we are principally concerned with comparing the net performance and basic characteristics (fees, liquidity, shorting, leverage, and turnover) of liquid alternative hedged mutual funds to private placement hedge funds.

Hedge mutual funds are broadly defined as 1940 Act mutual funds that employ historically popular hedge fund strategies including, but not limited to, equity long short, market neutral, and managed futures.

In compliance with the SEC and 1940 Investment Company Act rules, liquid alternative mutual funds (LAMFs) must limit borrowing to only one-third of total assets, cover short positions, restrict investment in illiquid securities to 15% of total assets, and provide daily liquidity and pricing. In contrast, hedge funds do not face such constraints and are largely unregulated. In addition to lighter regulation, hedge funds have better incentives as they usually charge performance-based incentive fees, while hedged mutual funds usually do not, only charging a flat fee. Differences in both regulation and incentives suggest that LAMFs are likely to underperform HFs (what is often referred to as the Regulation and Incentives Hypothesis).

In this study, LAMFs used in our sample are mutual funds identified in the Morningstar Alternatives category, our broader sample of traditional mutual funds (TMFs) comes from the Morningstar Mutual Fund Database, and our sample of hedge funds comes from the live and dead fund Hedge Fund Research (HFR) databases. We find that LAMFs underperform HFs on average by 2-3% per year on a net-of-fee basis, how ever this could very well be a result of hedge funds having the ability to take on greater risk. Controlling for standard risk factors, we find that LAMFs underperform HFs on average by between 1-2% per year as measured by alpha.

We also find that market neutral strategies appear less hindered in a 1940 Act vehicle as they are able to produce a more similar amount of alpha when controlling for various risk factors. Interestingly, equity long-short mutual funds have a lower equity market beta compared to their equity long-short hedge fund counterparts.

We do find that market neutral, equity long short, managed futures, and multi-alternative

mutual funds tend to have significantly smaller alpha, by roughly 1.38%, 1.49%, 1.54% and 1.80% respectively, compared to their hedge fund strategy counterparts when averaging across alpha estimates from several factor models, namely those of Sharpe [1964], Carhart [1997], Pastor and Stambaugh [2003], and Agarwal and Naik [2004].

Such findings provide important implications for investors seeking hedge fund-like returns while considering the importance of liquidity, transparency and fees. Such findings may also have implications for policy makers interested in the overall leverage of LAMFs and their compliance with 1940 Act Rules.

The paper proceeds as follows: Section 2 discusses related literature and outlines the three hypotheses. Section 3 describes the data and empirical strategy around assessing performance. Section 4 investigates the results including differences in performance and risk factor exposures across different alternative vehicles and strategies. Section 5 concludes.

2. Literature and Theory

Only a few previous studies have explored the performance gap between liquid Alternative mutual funds and hedge funds. Agarwal, Boyson and Naik [2009] compares the Performance of "hedged mutual funds" and hedge funds between 1994 and 2004, finding that Hedged mutual fund alphas lag hedge fund alphas between 5% and 7% per annum on a net-of-fee basis, using both Carhart [1997] four-factor models and Fung and Hsieh [2004] seven-factor models. One explanation they argue for why hedge funds outperform both hedged mutual funds and mutual funds is that hedge fund managers possess greater security selection skill, also known as the Skill Hypothesis, which is highlighted in the study.

One key finding from Agarwal, Boyson and Naik [2009] is that hedged mutual funds which are managed by diversified investment firms including previous or concurrent experience with managing hedge funds tend to outperform hedged mutual funds that are managed by specialized firms that have no hedge fund experience, with a difference in annual alphas between 1% and 2% on a net-of-fee basis, using the same models mentioned previously. More recently Cliffwater hedge fund consultants analyzed over 100 alternative asset firms

that offer both private placement hedge fund and liquid offerings in the same alternative category, finding that liquid alternative performance lags hedge funds per annum by approximately 1% on a net-of-fee basis. This difference does not control for well known risk factors, however, the authors do note that this gap in performance shrinks during periods of market distress, when there is a premium for liquidity. Their definition of liquid alternatives includes 1940 Act mutual funds, separately managed accounts, UCITs funds, and listed securities, including closed-end funds. Since these vehicles all differ in the amount of illiquid assets they are limited to carry (1940 Act mutual funds can have no more than 15% of holdings illiquid while SMAs can hypothetically carry 100% of illiquid holdings), we restrict our own analysis of liquid alternatives to 1940 Act mutual funds.

Nohel, Wang and Zheng [2010] similarly explore side-by-side management of hedge fund managers who also manage mutual funds. They find that hedge fund managers who also engage in side-by-side management tend to underperform hedge fund managers that do not engage in side-by-side management. Cici et al. [2006] also studies side-by-side management finding that side-by-side managers underperform their mutual fund strategy peer group. Mains [2014] provides a good introduction to liquid alternatives and their brief history along with a cursory comparative performance analysis of hedged mutual funds to hedge funds without the use of any risk factors. Stulz [2007] also provides an excellent summary of hedge fund studies and their measurements of alpha.

McCarthy [2014] and McCarthy [2015] provide a good overview of equity long short alternative mutual funds and multi-alternative mutual funds respectively. Lewis [2016], Black [2015] and Maxey and Davis [2015] also provide a good overview of the benefits of liquid alternative mutual funds to retail investors and clarify other misconceptions behind the asset class.

Moreover, defining what constitutes a liquid alternative and what strategy categories comprise the liquid alternative universe is a critical task and one somewhat subjective. Furthermore, this task becomes even more difficult as funds change their strategy over time. While Morningstar has developed an alternative category for 1940 Act mutual funds, Wilshire

Associates produces the Wilshire Liquid Alternative Index which produces a slightly different return stream than the Morningstar alternative universe. Whether to include UCITS funds or other products registered internationally is an important question of high consequence for the return stream of the liquid alternative universe. For the purpose of this study, we stick to analyzing the universe of 1940 Act alternative mutual funds identified in the Morningstar universe, in part for the benefit of U.S. retail investors and U.S. regulators.

3. Data

3.1 Liquid Alternative Mutual Funds

For the sample of liquid alternative mutual funds [LAMFs] , we begin by including all mutual funds from the Morningstar database that are listed in the Morningstar Alternative category. In particular, we look at institutional shareclasses of LAMFs since their fee structure should roughly be more comparable with the fees charged by hedge funds in the HFR database.

Moreover, since the hedge fund return streams provided by HFR are net-of-fees, our objective of comparing LAMFs to HFs requires that we compare the net performance an institutional investor would receive in either setting.

Unlike other studies such as Agarwal [2009] that use hedge fund data from the Lip per/TASS Database, we instead use hedge fund data from the HFR Database, which consists of a larger sample of hedge funds. This provides us with the final sample of many thousands of hedge funds.

We also look use the Morningstar Mutual Fund Database to obtain asset data for the universe of 1940 Act mutual funds in addition to liquid alternative mutual funds [Exhibit 2].

We combine duplicate share classes and take asset-weighted averages of the expenses, turnover, loads, and fees. We identify a total of 368 LAMFs during our sample period.

We also gather corresponding quarterly SEC holdings filings to determine gross and net exposures as well as portfolio turnover.

3.2 Hedge Funds

For these same hedge funds, we gather their corresponding SEC 13-F filings for the

purpose of determining portfolio turnover. We also use the weekly Morgan Stanley Prime Brokerage leverage reports, which include short positions, for the purpose of determining gross and net exposures.

3.3 Factors

Since mutual funds and hedge funds are exposed to a number of risk factors, we use risk-adjusted performance measures (alphas) for all the analyses.

Alphas are defined as the intercepts from various regression models. The first is the Carhart [1997] four-factor model widely used across mutual fund studies. The four factors include the CRSP value-weighted market excess return ($r_{m,t}-r_{f,t}$), the two Fama and French [1993] factors: size (SMB) and book-to-market (HML), and the Jegadeesh and Titman [1993] momentum (UMD) factor. Asness, Moskowitz and Pedersen [2013] provide similar value and momentum factors which could be substituted in this specification:

$$(r_{p,t} - r_{f,t}) = \alpha + \beta_{MKT}(r_{m,t} - r_{f,t}) + \beta_{SMB}SMB_t + \beta_{HML}HML_t + \beta_{UMD}UMD_t + \varepsilon_t \qquad (1)$$

The second model is the Fung and Hsieh [2004] seven-factor model, which includes an equity market factor, a size-spread factor, a bond market factor, a credit spread factor, and three option-based trend following factors for bonds, currencies, and commodities. For both models, we estimate alphas individually for each fund using the prior 24 months of gross-of-fee and net-of-fee returns for our gross and net performance measures. The trend following (time series momentum) factors of Moskowitz, Ooi, and Pedersen [2012] would also be a good substitute in this specification with n-factors each denoted as $F_{i,t}$:

$$(r_{p,t} - r_{f,t}) = \alpha + \Sigma^{n}_{i=1}\beta_i F_{i,t} + \varepsilon_t \qquad (2)$$

Finally, we estimate two other models for robustness. These include Carhart's [1997] 4-factor model augmented with (a) Pastor and Stambaugh's [2003] liquidity factor, (b) Frazzini and Pedersen's [2014] betting against beta factor, and (c) Agarwal and Naik's [2004] put

and call option (out-of-the-money and at-the-money factors). Jurek and Stafford [2015] demonstrate that aggregate hedge fund returns can be replicated with a out-of-the-money put-selling strategy on the market. Demonstrating the extent to which liquid alternative mutual funds can be replicated by such a put-selling strategy is an interesting question and can provide some answers about how different the cost of capital for liquid alternative investments is from traditional hedge fund investments.

4. Results

4.1 Liquid Alternative Mutual Fund Asset Class Performance and Characteristics

Exhibit 1 displays asset class cumulative returns for (1) the average liquid alternative mutual fund (LAMF) in the Morningstar Alternative Universe, (2) the average hedge fund (HF) in the HFR database, (3) the S&P 500 as a proxy for U.S. equity returns, (4) the Barclays U.S. Aggregate index as a proxy for U.S. fixed income returns, and (5) the risk-free rate. Similarly, Table 1 displays the average annual return, volatilities, maximum drawdowns, Sharpe ratios (using returns data from 1994 to 2016 inclusive) and annual return in each year from 1994 to 2016 for each of the above asset classes.

While in average annualized return, the S&P 500 (returning 9.17%) outpaced hedge funds [7.98%], the Barclays U.S. Aggregate index [5.41%] liquid alternative mutual funds [5.65%], accounting for risk comes up with a very different ranking as the realized annualized standard deviation for the S&P 500 [14.67%] outpaces the realized annualized standard deviations for the average hedge fund [6.68%], the average liquid alternative mutual fund [5.08%] and the Barclays U.S. Aggregate [3.58%] [Exhibit 4].

As a result, the Sharpe ratios for the Barclays U.S. Aggregate (0.82), the average hedge fund (0.82), the average liquid alternative mutual fund (0.62) sharply surpass the Sharpe Ratio for the S&P 500 (0.46) [Exhibit 5].

Similarly, maximum drawdowns for the Barclays U.S. Aggregate (-5.15%), the average hedge fund (-21.42%) and the average liquid alternative mutual fund (-21.79%) are much smaller than the maximum drawdown of the S&P 500 (-50.95%) achieved in the aftermath of the

2008 financial crisis [Exhibit 6].

For this reason, like hedge funds, liquid alternative mutual funds can be viewed as a form of downside protection relative to U.S. equities.

4.2 Risk Factor Exposures

Exhibit 3 presents the regression results from our specifications in Section 3 that regress the return streams of Liquid Alternative Mutual Funds (LAMFs) and Hedge Funds (HFs) by style on various popular risk factors using data from January 1994 to December 2016.

Looking at equity long-short alternative mutual funds across various the Sharpe [1964], Carhart [1997], Pastor and Stambaugh [2003], Fung and Hsieh [2004] and Agarwal and Naik [2004] specifications fairly consistently suggests that these LAMFs have a statistically significant market betas between 0.31-0.36, slightly below the market beta of equity long-short hedge funds of 0.43-0.49. This difference could potentially have to do with 1940 Act leverage constraints which may prevent equity long short LAMFs from levering up on various long positions. This also might suggest that 1940 Act leverage constraints are more of a binding constraint on LAMFs than the 33% 1940 Act shorting limit constraints.

From the Carhart 4-factor specification, it appears that equity long-short LAMFs are long small cap and value stocks given statistically significant SMB And HML factors but refrain from trading on momentum. On the other hand, equity long-short HFs appear to be long small cap stocks and momentum stocks given statistically significant SMB and UMD factors but do not have a statistically significant exposure to value (HML).

With regard to alpha, in the CAPM and Carhart [1997] four-factor specifications, equity long-short mutual funds have positive alpha of around 4.40% and 3.28% respectively which is approximately 1-1.5% less than the alpha generated by equity-long-short HFs in these specifications (5.59% and 5.17% respectively).

This suggests that manager stock-picking skill as measured by alpha may be significantly impacted by the constraints of a 1940 Act vehicle.

Market neutral funds, true to their name, appear to have little market exposure, however

the equity market beta remains positive and statistically significant between 0.07-0.09 for market neutral LAMFs and 0.05-0.1 for market neutral HFs.

In addition, market neutral LAMFs appear to be long small cap stocks, value stocks and momentum stocks at a statistically significant level. The average market neutral hedge fund on the other hand appears to be long only value stocks and momentum stocks.

Interestingly, both market neutral LAMFs and market neutral HFs appear short the Fung and Hsieh [1997] bond trend following factor at a statistically significant level.

With regard to alpha, in the CAPM and Carhart [1997] four-factor specifications, market neutral LAMFs have positive alpha of around 3.31% and 2.62% respectively which is approximately 1-1.5% less than the alpha generated by market neutral HFs in these specifications (4.75% and 3.82% respectively).

In the Agarwal and Naik [2004] put option strategy specification, put-writing strategies also appear to be statistically significant for multialternative LAMFs, equity longshort HFs and market neutral HFs which is consistent with Jurek and Stafford [2015] who show hedge fund returns can be replicated with put-writing strategies.

Interestingly, the Pastor and Stambaugh [2003] liquidity factor is only statistically significant for multialternative LAMF or HF average return series which is consistent with the notion that some multialternative strategies may engage in strategies that involve gaining exposure to illiquid securities.

In addition to a statistically significant equity market factor, multialternative LAMF and HF strategies both appear to have some statistically significant exposure to momentum stocks.

The Carhart [1997] 4-factor and Pastor and Stambaugh [2003] 5-factor models give multialternative LAMFs statistically significant alphas of 4.17% and 3.14% respectively while multalternative HFs produce statistically significant alphas of 5.05% and 4.98% respectively.

The Fung and Hsieh [1997] 7-factor model which includes several trend following factors do not give any indication of a statistically significant alpha and provides wildly varying alpha estimates across various hedge fund strategies.

However, given the beta estimates from the Fung and Hsieh [2004] seven factor

regression, it appears that managed futures style liquid alternative mutual funds have very similar exposures to their managed futures hedge fund counterparts, in particular being similarly long the commodity trend following factors at a statistically significant level.

In terms of alpha, it appears that managed futures LAMFs underperform their managed futures HF counterparts by nearly 2% depending upon the regression specification however there are no statistically significant alpha estimates for the LAMF or HF managed futures average return time series. This in part may be a consequence of a shorter return series given that managed futures strategies did not become mainstream until more recently.

When averaging across alpha estimates from a Sharpe [1964] CAPM, Carhart [1997] 4-factor model with the Fama and French [1993] size and value factors along with a momentum factor, Pastor and Stambaugh [2003] 5-factor model (adding a liquidity factor), and an Agarwal and Naik [2004] 5-factor model with various option strategies, we find that market neutral, equity long short, managed futures, and multi-alternative mutual funds tend to have significantly smaller alpha, by roughly 1.38%, 1.49%, 1.54% and 1.80% respectively, compared to their hedge fund strategy counterparts.

This has several implications for how 1940 Act liquidity, shorting, and leverage constraints can hinder the ability of LAMF managers to deliver alpha similar to the alpha provided by unconstrained hedge funds.

5 Conclusion

After comparing liquid alternative mutual funds (LAMFs) to hedge funds (HFs) both in aggregate and across investment styles, this paper identifies several notable similarities and differences.

First, while the average LAMF and the average HF both have underperformed the S&P 500 in average annualized return between 1994 and 2016, the average LAMF and HF have significantly less realized risk as measured by standard deviation. They further have realized higher Sharpe ratios compared to the S&P 500, but still below the Sharpe Ratio of bonds as measured by the Barclays U.S. Aggregate.

In addition, liquid alternative mutual funds, like hedge funds, can be viewed as a form of downside protection relative to U.S. equities given their milder underperformance during the 2008-2009 financial crisis.

We also find that equity long-short, market neutral, multialternative and managed futures strategies all appear to have hindered alphas in a 1940 Act after controlling for various risk factors.

We do find that managed futures and multi-alternative mutual funds tend to have significantly smaller alpha, by roughly 1.5% and 2.0% respectively, compared to their hedge fund counterparts.

As the SEC considers rule 18f-4 that would limit the use of leverage and derivatives in 1940 mutual funds including a 150% cap on derivatives exposure used to increase market risk and a 300% limit on derivatives used to reduce market risk, we hope that this paper provides evidence of the risk and return characteristics of liquid alternative mutual funds, namely that they bear less risk and smaller drawdowns compared to U.S. equities. While most equity-long short and market-neutral mutual funds have positions that are within the limits proposed by the SEC, multi-alternative funds and managed futures funds may fall outside these limits. Most importantly, this paper demonstrates that derivative exposures taken by such strategies do no always equate to higher levels of overall risk.

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Exhibit 1. Asset Class Performance Comparison. This Figure plots the cumulative total return for the aggregate group of liquid alternative hedged mutual funds from the Morningstar alternative category, the Hedge Fund Research Fund Weighted Index (HFRI), the S&P 500 index, and the Barclays Aggregate Bond Index from January 1994 to December 2016.

	Liquid Alternative Mutual Funds (Morningstar Alternative Universe)	Hedge Funds (HFRI Fund Weighted Composite Index)	S&P 500	Barclays US Aggregate Bond Index
Avg. Annual Rate of Return (%)	5.65	7.98	9.17	5.41
Annual Standard Deviation (%)	5.08	6.68	14.67	3.58
Sharpe Ratio	0.62	0.82	0.46	0.82
Maximum Drawdown (%)	-21.79	-21.42	-50.95	-5.15
Annual Return (%)				
1994	0.57	4.10	1.32	-2.92
1995	16.85	21.50	37.58	18.47
1996	12.86	21.10	22.96	3.63
1997	14.04	16.79	33.36	9.65
1998	8.61	2.62	28.58	8.69
1999	5.63	31.29	21.04	-0.72
2000	16.38	4.98	-9.10	11.63
2001	4.17	4.62	-11.89	8.44
2002	-3.47	-1.44	-22.10	10.26
2003	12.26	19.55	28.68	4.18
2004	7.65	9.05	10.88	4.41
2005	5.74	9.27	4.91	2.86
2006	9.28	12.89	15.79	4.33
2007	4.92	9.95	5.49	6.97
2008	-15.16	-19.03	-37.00	5.24
2009	11.97	20.01	26.46	5.93
2010	5.37	10.24	15.06	6.54
2011	-1.68	-5.25	2.11	7.84
2012	2.93	6.37	16.00	4.21
2013	7.35	9.14	32.39	-2.02
2014	5.41	2.98	13.69	5.95
2015	3.27	-1.11	1.38	0.57
2016	0.54	5.53	11.96	2.66

Exhibit 2. Asset Class Net Assets for Liquid Alternative Mutual Funds (LAMF)), Traditional Mutual Funds (TMF), and Hedge Funds (HF).

	Liquid Alternative Mutual Funds Net Assets ($ bn)	Mutual Funds Net Assets ($ bn)	Hedge Funds Net Assets ($ bn)
1994	$1	$2,155	$167
1995	$1	$2,811	$186
1996	$1	$3,526	$257
1997	$1	$4,468	$368
1998	$2	$5,525	$375
1999	$3	$6,846	$456
2000	$5	$6,965	$491
2001	$5	$6,975	$539
2002	$6	$6,384	$626
2003	$10	$7,204	$820
2004	$19	$8,095	$913
2005	$24	$8,891	$1,105
2006	$33	$10,398	$1,465
2007	$44	$12,002	$1,868
2008	$57	$9,604	$1,407
2009	$58	$11,113	$1,600
2010	$60	$11,832	$1,917
2011	$75	$11,627	$2,008
2012	$89	$13,045	$2,252
2013	$132	$14,031	$2,630
2014	$200	$18,065	$2,850
2015	$206	$16,724	$2,900
2016	$209	$17,644	$3,020

Notes: Liquid alternative mutual fund (LAMF) and traditional mutual fund (TMF) totals data is from Morningstar. Hedge fund (HF) data is from Hedge Fund Research

Exhibit 3. Alphas and Risk Factors for Liquid Alternative Mutual Funds (LAMFs) and Hedge Funds (HFs) By Style using data from January 1994 to December 2016.

	Multialternative					Equity Long Short					Market Neutral					Managed Futures*				
	Morningstar Multialternative Category		HFRI Fund Weighted Index		Difference	Morningstar Equity Long Short Category		HFRI Equity Hedge Index		Difference	Morningstar Market Neutral Category		HFRI Market Neutral Index		Difference	Morningstar Managed Futures Category		Newedge CTA Index		Difference
CAPM Alpha	3.63		5.22	***	-1.58	4.40	***	5.59	***	-1.18	3.31	***	4.75	***	-1.44	2.47		3.97		-1.50
	(2.26)		(0.83)			(0.08)		(1.07)			(0.61)		(0.61)			(2.37)		(2.58)		
Carhart 4-Factor Alpha	4.17	*	5.05	***	-0.88	3.28	***	5.17	***	-1.89	2.62	***	3.82	***	-1.20	2.17		3.51		-1.35
	(2.23)		(0.74)			(0.87)		(0.93)			(0.57)		(0.52)			(2.35)		(2.49)		
Pastor and Stambaugh 5-Factor Alpha	3.14	***	4.98	***	-1.84	3.65	***	5.24	***	-1.59	2.43	***	3.95	***	-1.53	2.39		3.73		-1.35
	(0.63)		(0.77)			(0.90)		(0.97)			(0.58)		(0.55)			(2.56)		2.61		
Fung and Hsieh 7-Factor Alpha	-4.59		-2.33		-2.26	3.15		-4.04		7.19	-4.91		5.00		-9.90	-10.61		-3.21		-7.40
	(14.88)		(5.07)			(6.15)		(6.33)			(3.80)		(3.73)			(12.54)		(13.20)		
Agarwal and Naik 5-Factor Alpha	2.88	**	5.78	***	-2.90	5.14	***	6.43	***	-1.30	3.97	***	5.35	***	-1.37	2.48		4.46		-1.98
	(1.39)		(0.99)			(1.17)		(1.28)			(0.67)		(0.72)			(3.35)		(3.44)		
CAPM Beta Estimates	0.26	***	0.36	***		0.31	***	0.48	***		0.08	***	0.06	***		-0.06		-0.05		
	(0.04)		(0.02)			(0.02)		(0.02)			(0.01)		(0.01)			(0.04)		(0.05)		
Adjusted R^2	0.28		0.65			0.50		0.67			0.15		0.09			0.01		0.00		
Beta Estimates (Carhart 1997)																				
β_{Market}	0.45	***	0.34	***		0.34	***	0.46	***		0.09	***	0.10	***		0.00		0.04		
	(0.05)		(0.02)			(0.02)		(0.02)			(0.01)		(0.01)			(0.05)		(0.05)		
β_{SMB}	-0.17	***	0.14	***		0.05	**	0.20	***		0.07	***	0.01			-0.09		-0.15		
	(0.06)		(0.02)			(0.02)		(0.02)			(0.01)		(0.01)			(0.09)		(0.10)		
β_{HML}	0.05		-0.04	*		0.25	***	-0.03			0.08	***	0.07	***		-0.04		-0.06		
	(0.06)		(0.02)			(0.02)		(0.03)			(0.02)		(0.01)			(0.08)		(0.08)		
β_{UMD}	-0.08	**	0.03	**		0.02		0.06	***		0.05	***	0.09	***		0.08	*	0.11	**	
	(0.04)		(0.01)			(0.01)		(0.02)			(0.01)		(0.01)			(0.04)		(0.05)		
Adjusted R^2	0.32		0.73			0.63		0.76			0.29		0.34			0.03		0.07		
Beta Estimates (Pastor and Stambaugh 2003)																				
β_{Market}	0.28	***	0.34	***		0.34	***	0.46	***		0.09	***	0.10	***		0.00		0.05		
	(0.01)		(0.02)			(0.02)		(0.02)			(0.01)		(0.01)			(0.05)		(0.05)		
β_{SMB}	0.03	*	0.14	***		0.06	**	0.20	***		0.06	***	0.01			-0.10		-0.15		
	(0.02)		(0.02)			(0.02)		(0.02)			(0.01)		(0.01)			(0.10)		(0.11)		
β_{HML}	0.16	***	-0.03			0.27	***	-0.02			0.08	***	0.07	***		-0.05		-0.05		
	(0.02)		(0.02)			(0.03)		(0.03)			(0.02)		(0.02)			(0.10)		(0.11)		
β_{UMD}	0.02	*	0.03	**		0.02		0.06	***		0.05	***	0.09	***		0.08		0.11	**	
	(0.01)		(0.01)			(0.02)		(0.02)			(0.01)		(0.01)			(0.05)		(0.05)		
β_{LIQ}	0.02	*	0.03	*		0.01		0.02			0.01		0.00			-0.04		-0.03		
	(0.01)		(0.02)			(0.02)		(0.02)			(0.01)		(0.01)			(0.06)		(0.06)		
Adjusted R^2	0.70		0.74			0.64		0.76			0.29		0.34			0.01		0.05		
Beta Estimates (Fung and Hsieh 2004)																				
$\beta_{S\&P500}$	0.50	***	0.33	***		0.31	***	0.43	***		0.07	***	0.05	***		0.04		0.10	*	
	(0.05)		(0.02)			(0.02)		(0.02)			(0.01)		(0.01)			(0.05)		(0.05)		
$\beta_{Size\ Spread}$	-0.08		0.21	***		0.13	***	0.30	***		0.09	***	0.03	**		-0.14	*	-0.21	**	
	(0.06)		(0.02)			(0.02)		(0.02)			(0.01)		(0.01)			(0.08)		(0.08)		
$\beta_{10\text{-year Treasury Yield}}$	0.09		0.16	***		0.10		0.23	***		0.13	***	0.10	***		0.25		0.25		
	(0.14)		(0.05)			(0.06)		(0.06)			(0.04)		(0.04)			(0.22)		(0.23)		
$\beta_{Credit\ Spread}$	0.07		-0.05			-0.16		-0.10			0.05		-0.19	**		0.13		-0.03		
	(0.30)		(0.10)			(0.12)		(0.13)			(0.08)		(0.08)			(0.25)		(0.26)		
$\beta_{Bond\ Trend\text{-}Following\ Factor}$	0.00		-0.01			-0.01	*	-0.01			-0.01	**	-0.01	***		0.00		0.03	*	
	(0.01)		(0.00)			(0.01)		(0.01)			(0.00)		(0.00)			(0.01)		(0.02)		
$\beta_{Commodity\ Trend\text{-}Following\ Factor}$	0.01		0.00			0.00		0.00			0.00		0.01	**		0.03	***	0.03	**	
	(0.01)		(0.00)			(0.00)		(0.00)			(0.00)		(0.00)			(0.01)		(0.01)		
$\beta_{Currency\ Trend\text{-}Following\ Factor}$	0.00		0.00			0.00		0.00			0.00		0.00			0.01		0.01		
	(0.01)		(0.00)			(0.01)		(0.01)			(0.00)		(0.00)			(0.01)		(0.01)		
Adjusted R^2	0.30		0.71			0.57		0.74			0.26		0.23			0.11		0.15		
Beta Estimates (Agarwal and Naik 2004)																				
β_{Market}	0.43	***	0.34	***		0.36	***	0.49	***		0.07	***	0.08	***		-0.03		-0.05		
	(0.02)		(0.02)			(0.02)		(0.03)			(0.01)		(0.02)			(0.06)		(0.06)		
$\beta_{ATM\ Call}$	0.17		0.45			-0.61		0.53			0.39		0.90			5.61		0.01		
	(0.73)		(0.52)			(0.61)		(0.67)			(0.35)		(0.38)			(5.09)		(5.21)		
$\beta_{OTM\ Call}$	0.48		-0.67			0.36		-0.91			-0.45		-0.81			-5.06		0.22		
	(0.66)		(0.47)			(0.56)		(0.61)			(0.32)		(0.35)			(4.78)		(4.89)		
$\beta_{ATM\ Put}$	3.11	*	-1.84			1.05		-2.82	*		-0.82		-0.27	**		2.89		-3.11		
	(1.61)		(1.15)			(1.36)		(1.48)			(0.77)		(0.84)			(10.10)		(10.35)		
$\beta_{OTM\ Put}$	-3.40	**	1.47			-0.70		2.54	*		0.68		0.49	**		-1.81		3.42		
	(1.50)		(1.07)			(1.27)		(1.38)			(0.72)		(0.78)			(9.49)		(9.73)		
Adjusted R^2	0.69		0.66			0.50		0.67			0.17		0.11			0.05		-0.03		

Notes: ***Represents statistical significance at the 1% level, **Represents statistical significance at the 5% level, *Represents statistical significance at the 10% level.
Managed Futures hedged mutual fund data begins in April 1, 2007 with the inception of the Guggenheim Managed Futures Strategy fund.
Agarwal and Naik (2004) factors are limited by Optionmetrics data through July 31, 2013. Pastor and Stambaugh (2003) factor data is only available through December 31, 2015

Exhibit 4. Asset Class Performance Comparison. This Figure plots the cumulative total return for the aggregate group of liquid alternative hedged mutual funds from the Morningstar alternative category, the Hedge Fund Research Fund Weighted Index (HFRI), the S&P 500 index, the Barclays Aggregate Bond Index, and the risk-free rate from January 1994 to December 2016.

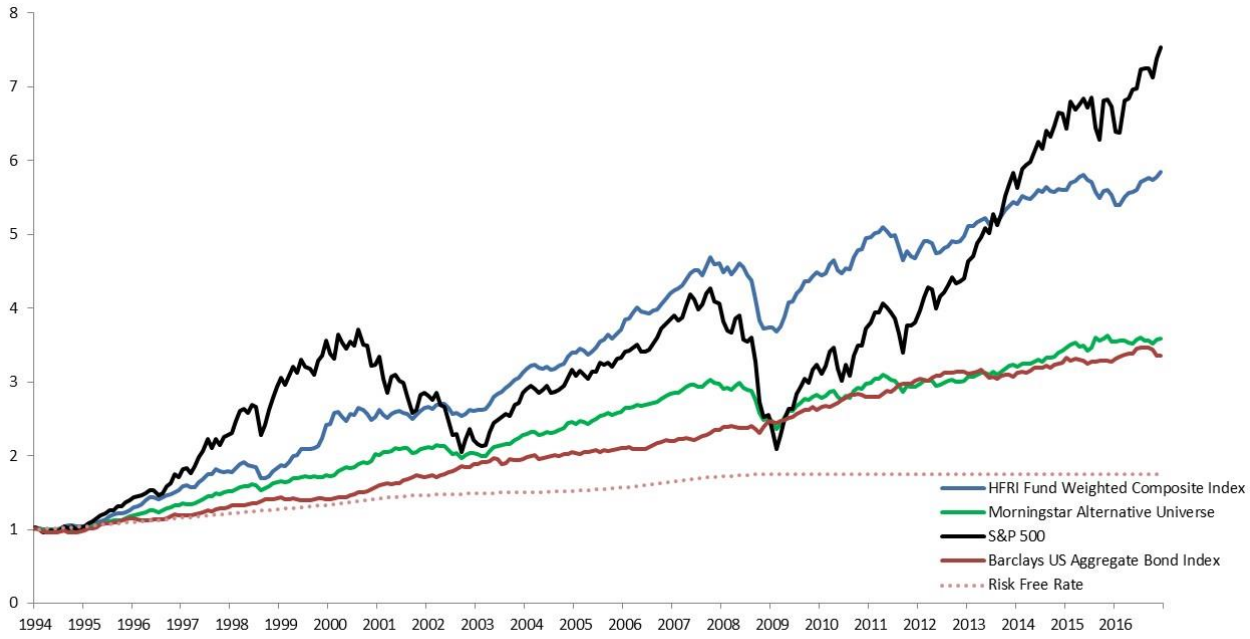

Exhibit 5. Asset Class Average Annualized Returns and Standard Deviations. This Figure plots the means and standard deviations for the aggregate group of liquid alternative hedged mutual funds from the Morningstar alternative category, the Hedge Fund Research Fund Weighted Index (HFRI), the S&P 500 index, the Barclays Aggregate Bond Index, and the risk-free rate from January 1994 to December 2016.

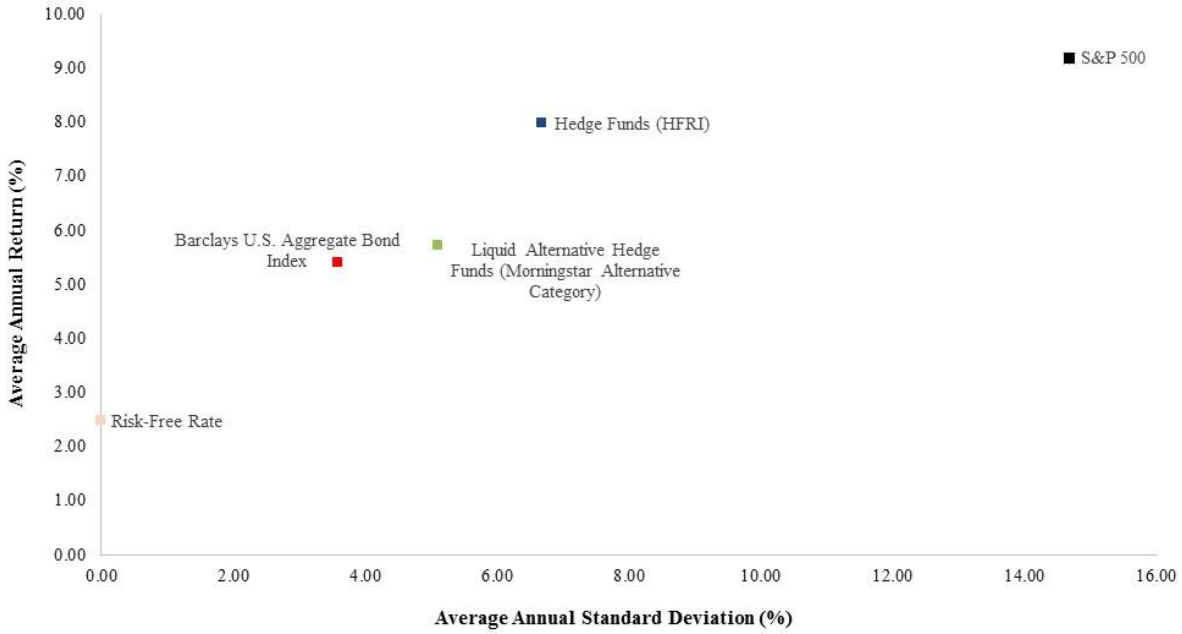

Exhibit 6. Asset Class Maximum Drawdowns. This Figure plots the maximum drawdowns the aggregate group of liquid alternative hedged mutual funds from the Morningstar alternative category, the Hedge Fund Research Fund Weighted Index (HFRI), the S&P 500 index, the Barclays Aggregate Bond Index, and the risk-free rate from January 1994 to December 2016.