Christopher Chung
Econophysics

April 3, 2018
Final Paper

Time Horizon Based Analysis of Favorite Hedge Fund Equities

INTRODUCTION:

Hedge funds are alternative investment vehicles which employ various strategies to generate positive returns for their investors (partners and limited partners). Hedge fund types include quantitative (algorithm driven), long short (traditional value investing), distressed investing (loans, commercial debt), activist (hostile takeover); this list is not exhaustive but provides a snapshot of the hedge fund industry.

Every quarter, Goldman Sachs publishes a list of the most popular hedge fund stocks for the previous quarter (1) (the Goldman Sachs Hedge Fund VIP Index TR). Through utilizing a variety of different filtering methods, one is able to observe investing trends within the hedge fund industry. At the foundation of this aggregation of equities, there exists the idea that hedge fund investments are preferable to those of the traditional investor. This paper seeks to examine that theory through comparing the percent return of securities, which are removed from the list (rejects) to those that remain on the list (favorites). To determine relevant time scales this analysis was performed upon several time intervals.

MATERIALS AND METHODS:

The past 10 years' quarterly lists of the Goldman Sachs Hedge Fund VIP Index, in an excel format, was obtained directly from Goldman Sachs. The information was fed into a python script, which formatted and concatenated the data for upload into a MYSQL database.

As SQL databases are efficient in filtering large datasets, it was the primary choice to conduct data filtering. SQL queries were run through a Sequel Pro program where the results were then placed into a Google sheet.

The following timescales were chosen for filtering the data: 10 year, 5 year, 3 year, 2 year, and 1 year. These reflected common industry time horizons (1-3 years) and personal investment time horizons (5-10 years). Two queries were written which compared the timescale year's (2008, 2013, 2015, 2016, 2017) first quarter holdings to the first quarter holdings of 2018.

The results of the two queries fell into two categories of securities; those which stayed within the list (favorites) and those which fell off the list (rejects). Securities, which were no longer traded due to reasons such as a bankruptcy, merger, or multiple IPOs were not included in this analysis. Additionally, any security which lacked data for the given years and quarters were excluded.

To normalize the returns, returns were compared as a percentage change of the initial stock price, rather than the dollar amount. Prices and Global Industry Classification Standard (GICS) sectors were obtained through a Bloomberg Terminal and a Yahoo Finance api within an excel and google sheet, respectively. After compiling the list of securities and their prices, the percent returns were calculated and stored as a vector in Matlab. The vectors for each year and each subset group are described in the following chart:

	Vectors size	Vectors size	Vectors size
Favorites	All Favorites (x)	All Favorites (x)	Top 5 Favorites (5)
Rejects	Equal number of top preforming rejects (x)	All Rejects (y)	Top 5 Rejects (5)
Group letter	A	B	C

Table 1: x and y denote vector size. The decreasing number of favorites as the time horizon increases was a limiting factor, hence why the number of remaining favorites was used as a standard. Group designation labels are listed a reference for table 2.

A Matlab script was then written utilizing an unequal variances t-test, which was chosen due to the unequal and unknown variances between the two groups (rejects and favorites). One assumed a normal distribution of returns. Additionally, a P value of less than .05 was indicative of a significant difference between the datasets (favorites and rejects for that time constant).

	10 year			5 year			3 year			2 year			1 year		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Mean return rejects	317.9302	77.2198	394.944	78.3921	29.4941	153.9918	-2.3723	-19.2661	46.4041	11.686	11.686	51.3832	13.1411	13.1411	41.6872
Standard Deviation Rejects	161.5793	177.3966	186.3964	63.3742	72.792	57.3249	38.2187	43.0949	41.0349	35.4768	35.4768	28.2693	26.4188	26.4188	11.5452
Mean return favorites	259.244	259.244	446.278	178.6412	178.6412	299.258	95.225	95.225	206.57	56.0804	56.0804	116.024	18.6681	18.6681	70.05
Standard Deviation Favorites	282.4298	282.4298	232.632	114.9669	114.9669	104.4318	102.4705	102.4705	130.0557	40.9229	40.9229	24.3279	31.95596	31.95596	19.6794
Significant Difference between data sets	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes
P value	0.5978	0.0964	0.7107	0.0056	0.00011147	0.0332	0.001	0.00020639	0.0488	0.00027815	0.00027815	0.0049	0.5957	0.5957	0.0296
Lower confidende interval	-293.5079	-39.24	-215.6479	32.41	83.4043	15.963	1.2876	61.2155	1.2876	21.9217	21.9217	26.29	-12.9449	-12.9449	3.8216
Upper confidene interval	176.1363	404.299	403.2944	168.0855	214.8901	274.5694	151.1087	167.7667	319.0522	67.4671	67.4671	103.2527	23.999	23.999	52.904

Table 2: Green in the mean's row indicated a return greater than 100%. Red indicates a negative return. Note A and B are equal as number of rejects and number of favorites were equal

RESULTS / DISCUSSION:

10-year analysis (2008-2018): *Hedge fund performance during and after a recession*

Analysis revealed 9 favorites and 34 rejects. Of the 9 favorites 7 had positive returns (6 greater than 100%). Of the 34, 19 had favorable returns (11 greater than 100%). A direct one-to-one portfolio comparison based upon returns, illustrated that the average of the top 9 performing rejects outperformed the favorites by 58%. In addition, the top five favorites outperformed the top five rejects by 51.3%.

Unsurprisingly, 4 of the top 5 winners for the favorites all fell into the information technology GICS sector. The remaining 1 fell into consumer discretionary. More interestingly, the rejects showed a greater diversity of sectors; 2 from healthcare, 1 from information technology, 1 from industrials, and 1 from real estate. One can hypothesize that the implementation of the affordable healthcare act (a.k.a. Obamacare) may have had a role in healthcare's prominence in the top 5 returns of the rejects, however a separate analysis would need to be done to determine if that was indeed the root cause.

On the losing side, 2 of the 9 favorites exhibited negative returns and both were within the financial sector. Together losses averaged -45%. In terms of the rejects, 15 of the 34 exhibited negative returns with an average loss of -56%.

Given the limited data on negative returns from the favorites it is difficult to discern any meaningful statistical conclusions from their performance. However, on a fundamental level the top favorites' losers reflected those banks, which received the first and second largest government bailouts (2). Therefore, it is plausible that the banks which receive the largest bailout are unlikely to have their share price recover after a financial crisis.

The rejects' losers yielded much more data, in terms of analysis. More than half (8) of the 15 names were energy related and had a return of approximately -52%, over

10 years. The other negative performing reject sectors were utilities, telecom, materials, 2 industrials, 1 financial, and 1 information technology.

Further study of this trend revealed that in the first quarter of 2008, a large number of hedge funds were heavily investing in oil (given the rapidly increasing prices). A review of supplementary research cites investors' tendency to look for any "hard-asset class" during the financial crisis, as the primary driver for the movement into commodity-related equities (3). With this in mind, one can postulate that investors should be wary of investing in rapidly rising oil commodities and related industrials during the onset of a recessions/bear market. If one is required by mandate to short a security, it may be more prudent to short oil and/or a related industrial at the onset of a recession.

Statistical analysis of the two datasets revealed that hedge fund favorites do not outperform their rejects over a 10-year timespan in a statistically significant way. Therefore, an investor simply holding a "basket" of hedge fund rejects for 10 years can yield a return that is statistically identical to those which stay within the favorites list over 10 years. On the other hand, this finding is detrimental to hedge fund managers as it provides little support for the theory that hedge funds create long term value.

When including management fees (the typical 2% of assets and 20% of growth), the hedge fund favorites would have actually yielded a poorer return for their investors than if those investors had invested in the rejects. Going forward, hedge fund investors would be wise to consider a hedge fund's time horizons prior to investing.

5-year analysis: *Hedge fund performance post-recession*

Analysis revealed 16 favorites and 30 rejects. Of the 16 favorites, 15 had positive returns (12 greater than 100%). Of the 30 rejects, 19 had favorable returns (4 greater than 100%). A direct one-to-one portfolio comparison, based upon returns, illustrated that the average of the top 16 performing favorites outperformed the top 16 rejects by 100%. In addition, the top five favorites outperformed the rejects by approximately

250%. Moreover, 4 of the top 5 winners for the favorites all fell into the information technology and consumer GICS sector. The remaining one fell into the industrials sector. Once again, the rejects showed a greater GICS sector diversity however, no GICS sector markedly stood out.

Statistical analysis of the two datasets revealed that hedge fund favorites outperformed the rejects over a 5-year timespan in a statistically significant way. Additionally, the favorites outperformed the rejects by a margin of 100%. Therefore, in the recovery from a recession, hedge fund managers proved that they are worth the fees they charge, given their significantly better performance. Accordingly, hedge funds ability to adapt to a rapidly changing market, proved especially fruitful for hedge fund investors, compared to static (unchanged) portfolios. In an additional comparison revealed that, the favorites outperformed the S&P 500, by over 200% (4).

3-year analysis: Hedge fund performance during a bull market

A bull market is a market in which all assets are rapidly rising and buying equities is generally encouraged.

Analysis revealed 18 favorites and 25 rejects. Of the 18 favorites 17 had positive returns (5 greater than 100%). Of the 25, 4 had favorable returns (0 greater than 100%). A direct one-to-one portfolio comparison, based upon returns, illustrated that the average of the top 18 performing favorites outperformed the top 18 rejects by 100%. In addition, the top five favorites outperformed the top five rejects by approximately 150%. Most importantly the average return of the rejects, for 3 years, was negative (-2.3723%), meaning that investors holding onto these equities would have lost money on their investment, in a bull market.

Statistical analysis of the two datasets revealed that hedge fund favorites outperform the rejects over a 3-year timespan in a statistically significant way. Additionally, the favorites outperformed the rejects by 100% and beat the S&P 500 index by nearly 60% (4).

However, simply holding a basket of hedge fund rejects would have easily yielded negative returns. Deeper analysis reveals that any equity not categorized as a financial or information technology performed poorly for the rejects. Additionally, any consumer discretionary security, which fell off the favorites list was shown to exhibit substantial losses over this three-year period. While, any consumer discretionary remaining on the list showed a tendency to significantly outperform the market. This finding supports the idea that there is substance behind the theory of “value investing,” as deep fundamental research proved to be key in identifying the consumer winners (assuming hedge funds take a fundamental investing approach).

2-year analysis: Hedge fund performance during a period of low volatility

Analysis revealed 23 favorites and 25 rejects. Of the 23 favorites, 22 had positive returns (3 greater than 100%). Of the 25 rejects, 19 had favorable returns (1 greater than 100%). A direct one-to-one portfolio comparison, based upon returns, illustrated that the average of the top 23 performing favorites outperformed the top 23 rejects by 50%. In addition, the top five favorites outperformed the top five rejects by approximately 60%.

Statistical analysis of the two datasets revealed that hedge fund favorites outperform the rejects over a 2-year timespan in a statistically significant way. In a low volatility market, hedge funds performed well; outperforming the rejects and beating the S&P 500 index (4).

Once again, hedge fund rejects performed worse than the S&P 500 index. The finding that hedge funds perform better in periods of low volatility goes against the traditional ideas and further study is needed to truly corroborate this observation.

1 year analysis: Hedge fund performance before the peak of a bull market

Analysis revealed 32 favorites and 14 rejects. Of the 32 favorites, 22 had positive returns (0 greater than 100%). Of the 14 rejects, 8 had favorable returns (0 greater than 100%). A direct one-to-one portfolio comparison, based upon returns, illustrated that the average of the top 32 performing favorites outperformed the top 14 rejects by 5%. In addition, the top five favorites outperformed the top five the rejects by approximately 30%.

Statistical analysis of the two datasets revealed the performance was statistically equivalent between hedge fund rejects and favorites over a one year period in a bull market. From this, it can be concluded that short-term time horizon hedge funds offer no statistical advantage over traditional value investing. Accordingly, with the addition of high hedge fund fees, they perform worse than the rejects.

It is interesting to note that if one is able to somehow predict a top five performing hedge fund favorite equity over a top five performing reject they offer a statistically significantly better return on investment.

DISCUSSION:

Looking back at this study, one can reasonably conclude that investing in hedge funds with an investment time horizon of two to five years yields a better return on capital than simply investing in hedge fund rejects. Upon subset analysis, three out of the three groups (A, B, and C) in each of these years a yielded a statistically better return than those investments which migrated out of the hedge fund favorites list.

Alternatively, there is hope for people who scour the favorites list annually. Approximately 50% the list will be new within 2 years and 80% within 10 years. An investor who annually chooses a security at random from this list has a 30% chance at achieving a 100% return on their investment within 5 years, as well as a 300% return on their investment within 10 years (which can be better than a hedge fund favorite, when

including fees). Furthermore, an investor who is educated and can narrow down that list of rejects through a value based approach, will be able to further improve their odds.

One would have liked to add the additional variable of share turnover in addition to price, however, the lack of data within that space created a considerably smaller data set, which was not conducive to analysis.

It would have also been helpful to review the various time scales at various different points rather than simply Q1 of 2018, however the 10 years of data proved to be a constraint, as consistency in analysis was preferred over variability. Going forward future studies would do well to consider if this analysis holds for the same time horizons over different starting and end points (ie comparing Q3 2016 to Q3 2017).

Sources

1. https://www.gsam.com/content/dam/gsam/pdfs/us/en/ETF/Goldman-Sachs-Hedge-Fund-VIP-Index-Methodology.pdf?sa=n&rd=n

2. https://www.reuters.com/article/us-banks/bank-of-america-gets-big-government-bailout-idUSTRE50F1Q720090116.

3. http://money.cnn.com/2008/06/27/markets/oil/

4. https://dqydj.com/sp-500-return-calculator/