An Analysis of Hedge Fund Equity Returns from Public Filings[1]

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ABSTRACT

This study focuses on assessing the performance of portfolios constructed from publicly available filings of institutions managing hedge funds and several factors that affect that performance. Previous studies of mutual and hedge funds suggest that institutions with fewer assets and more concentrated portfolios will outperform and that the outperformance will be the result of selection ability with no contribution from timing ability. Previous work also suggests that portfolios consisting of the largest position and newly initiated positions will outperform. The paper confirms that institutions managing hedge funds with fewer assets and more concentrated portfolios (at the industry, sector and individual position level) outperform and that the outperformance is the result of selection ability alone. The paper finds no evidence that the largest position of a portfolio outperforms the aggregate portfolio, but does find evidence that newly initiated positions outperform terminated positions.

[1] The author would like to thank Novus Partners, Inc. for providing the data to allow this study to be done and Jeffrey Wurgler for helpful comments and guidance.

I. INTRODUCTION

Hedge funds have emerged as a vehicle for qualified investors to invest money in asset classes (futures, distressed, derivatives) and strategies (long/short, market neutral) that are not available through traditional retail investing. For this access, hedge funds charge a premium, historically 2% of assets under management and 20% of profits over a high water mark. Competition has increased and fees have come down, such that a recent average for fees was 1.6% and 18.7%[2]. Hedge fund management companies are required by law to file their holdings publicly with the SEC, if they manage over $100 million in certain securities (Brown and Schwarz 2011). Investors in some funds have limited information of the holdings of their current or potential investments, as the managers limit their disclosure of positions. The SEC filings are one limited way for investors to gain insight on a hedge fund.

The filings are done at a management company level, which means that a company with several funds (which could have different strategies) will file them together, further obscuring the information investors receive from the public filings.

The purpose of the paper is to determine, from the publicly available data, if there is any evidence that the funds provided selection ability in US listed equities and if that ability is affected by the composition of the portfolios (size, concentration, changes). The paper will attempt to quantify the affects of the portfolio's size, concentration and changes.

The paper finds any outperformance in the portfolios is due to selection ability and not due to timing ability, with no evidence that there is persistence in the outperformance. More concentrated portfolios (measured at the sector, industry and position level) and portfolios from

[2] New York Times Website, http://dealbook.nytimes.com/2012/12/28/imagining-a-future-of-lower-hedge-fund-fees/

institutions managing fewer funds have higher performance than less concentrated portfolios and portfolios from institutions managing more funds. Portfolios constructed from newly initiated positions and from increased positions outperform those constructed from terminated positions and decreased positions respectively. There is no evidence that the largest position in a portfolio performs differently from the aggregate portfolio, regardless of the portfolio's concentration.

Section II reviews the previous literature for hedge funds and position level data for mutual funds along with the hypotheses of this paper. Section III describes the data and methodology used for the analysis. Section IV elaborates on the results. Section V summarizes the report and reports the conclusions of this paper.

II. LITERATURE REVIEW & HYPOTHESES

More work has been done at the individual holding level with mutual funds than with hedge funds, as the data is richer for mutual funds. The literature suggests that mutual fund managers exhibit the ability to select stocks that outperform the general market by 100bps per year when controlled for size, value and momentum (DGTW 1997). This outperformance does not justify the fees charged by mutual funds. There is no indication that the managers are able to time the switch from large capitalization to small capitalization, value to growth or past winners to past losers.

The evidence is against mutual fund performance persistence; alpha persistence has been explained by the momentum effect (Carhart 1997). The selection ability of any mutual funds was shown not to be persistent when fund flows and momentum were accounted for (Wermers 2004).

It was found that investors would have been better off purchasing the stocks in the outperforming funds portfolios that by purchasing the funds themselves.

There is evidence that the top ideas of managers (as measured by the value of the position in the portfolio) do sizably outperform on a risk-adjusted basis, up to 188bps per month (Cohen, Polk, Silli 2008). The same paper also showed that positions, which the manager increased and positions that were largely distinct from the rest of the mutual fund holdings universe also outperformed. In another paper, evidence was provided that suggested that portfolios with above concentration at the industry level outperformed the average concentrated portfolios by 158bps per year (Kacperczyk, Sialm, and Zheng 2005) and in turn that less concentrated portfolios underperformed the mean.

For hedge funds the first paper to look at individual holding data did not find any significant increased selection ability in comparison to mutual funds, when equal weighted, but did find some outperformance in the value-weighted returns, despite the higher fee structures. Hedge funds did have higher turnover and their holdings deviated more from the market portfolio. In contrast to the Cohen study above for mutual funds, there was no evidence that the top position of hedge funds outperformed(Griffin, Xu 2009).

Hedge funds can file with the SEC for the ability to delay their disclosure of certain positions when "necessary or appropriate in the public interest for the protection of investors". These confidential holdings of hedge funds, which are filed publicly later in amendments to the original 13-F, outperform significantly. This could be cited as one reason hedge funds do not release holdings information, even to investors. These positions are not insignificant; they are on

average 1/3 of total portfolio value and outperform by 500bps per year value-weighted. (Agarwal, Weijiang, Tang, Yang 2010)

H1: Portfolios with less total assets will outperform portfolios with greater total assets. (Teo 2007)

Hedge funds have difficultly incorporating more capital without altering their investment process. The hedge funds should have a greater advantage in investments that are obscure and have a limited ability to absorb funds. Once a hedge fund accumulates a greater amount of funds, it must reduce the concentration of its investments or it must reduce the liquidity of its positions; both options appear to reduce the expected performance.

H2: The highest weighted position in a portfolio will outperform the portfolio as a whole.

From the mutual fund data (Cohen, Polk, Silli 2008), the best ideas of the managers outperformed by a large margin the rest of the holdings. It seems logical that managers would place the highest weighting on the positions for which they have the most conviction.

H3: Newly initiated positions and increased positions will outperform terminated positions and decreased positions.

The mutual fund data (Cohen, Polk, Silli 2008), showed that new positions outperformed the portfolio as a whole. If managers do possess skill, it seems likely that their newest positions, for which it would be expected they have the most up to date thesis, would outperform other positions.

H4: More concentrated funds will outperform less concentrated funds.

Kacperczyk, Sialm, and Zheng (2005) paper showed that mutual funds more concentrated at the industry level outperformed less concentrated funds. This appears intuitive and would be expected with hedge fund managers as well. Managers likely possess industry and sector specific expertise; the more they concentrate on their strengths the more it would be expected that they would excel. There is a second reason to expect concentration to correlate with alpha. The funds in the sample pursue many different strategies. Those pursuing quantitative strategies will likely hold portfolios that look much more like the market portfolio than a typical long-short fund. The quantitative funds are deriving their returns from much shorter time frames than would be captured in the quarterly filings.

III. DATA & METHODOLOGY

The hedge fund holdings used for this paper were obtained from the Novus Public Holdings Database, which is maintained by Novus Partners, Inc. The firm collected the data as a part of their business operations. The holdings include any amendments to the original 13-F filings and were filtered for US listed long equity positions. Novus' determination of which management companies represented hedge funds was used to filter which companies were included in the sample. The filings are done at the management company level; individual hedge funds file together if they share the same management company. The filings are available quarterly and returns were calculated as of the beginning of the quarter and not when the filings were available; the funds have up to 45 days to file.

Returns for individual institutions were value-weighted. Monthly returns were evaluated with a CAPM regression, a Carhart 4-factor regression (Excess Return on the Market (MKTRF),

Small Minus Big (SMB), High Minus Low (HML) and Momentum(UMD)) and DGTW characteristic benchmarks. The DGTW benchmarks[3] takes the universe of stocks and divides them into market capitalization quintiles, then book to market quintiles (adjusted for industry) and finally momentum quintiles. There are 125 buckets of stocks for which the average return is calculated. Individual stocks are compared against the returns of the bucket that matches the given stocks size, value and momentum quintile.

The returns were disaggregated in to a Characteristic Timing (CT), Characteristic Selectivity (CS) and Average Style (AS) according to the methodology in (DGTW 97). CS represents the weighted difference between the individual holdings and the corresponding characteristic benchmark. CT represents the difference between the characteristic benchmark returns from the last month and the characteristic benchmark returns from a year prior. AS represents the weighted characteristic benchmark return from a year prior.

The max weight (MaxWeight or MAXWT) of a portfolio was defined as the highest value position divided by the whole portfolio's value. The industry (IndustryHerfindahl or HIND), sector (SectorHerfindahl or HSEC) and normal Herfindahl (Herfindahl or HERF) indexes were calculated by summing the squares of industry, sector and individual position weights in the portfolio respectively. The MSCI/S&P Global Industry Classification Standard (GICS)[4] definitions were used for industry and sector. Management companies with less than 8 holdings or a total portfolio value of less than $25 million were eliminated. An institution had to meet the criteria for the previous four quarters to be included in the sample.

[3] The DGTW benchmarks are available via
http://www.smith.umd.edu/faculty/rwermers/ftpsite/Dgtw/coverpage.htm
[4] http://www.msci.com/products/indices/sector/gics/gics_structure.html

The median number of holdings was steady in the vicinity of 50 holdings, while the average was a little over 100 holdings. If the number of holdings is weighted by portfolio value, the average jumps to close to 300 holdings. This supports the hypothesis above that the more capital invested in a fund, the less concentrated are the holdings of the fund.

The hedge fund holdings were weighted towards higher capitalization quintiles, higher momentum quintiles and very little value tilt. If weighted by portfolio value, the holdings quintiles, the momentum and value averages do not change, but the market capitalization increases. This makes sense intuitively, larger funds must increase the size of the companies in which they invest to accommodate all their investable capital.

The number of institutions increased steadily throughout the sample period, which began in 2000 and continued through 2011. There was a small decrease, as would be expected during the great recession, but the pre-recession high was surpassed.

The total value of the holdings, in the sample, followed a similar path, but the pre-recession high was not surpassed. Again, this follows from the markets drop and recovery. At the end of the sample, the major US market indices were still below their all-time highs.

There exists the possibility that there is a survivorship bias in the Novus data. The company began collecting the data in 2007. As can be seen in Figure 3, there are funds that exit the sample prior to 2007, which reduces the probability of a large survivorship bias. Note that the large number of funds at the far right of the graph corresponds to the last date of the sample, and not to institutions who were dropped from the sample because they ceased reporting.

As would be expected, for funds that ceased to report, there is an overweight percentage that were in the bottom quintile (quintile 1) in raw return and in CS for the previous twelve

months. Novus does not stop collecting a management company's filings unless the company stops reporting.

The variables used to measure the concentration fall in to two groups. MaxWeight and Herfindahl are highly correlated, while SectorHerfindahl and IndustryHerfindahl correlate highly. Value has a negative correlation with all the concentration variables. This is further evidence that hedge funds that have large amounts of capital to invest must lower their concentration to accommodate the extra capital.

The first evidence that portfolios with fewer funds to invest perform better than those with more funds to invest is in Table 5. The mean monthly return is well below the median monthly return for the portfolios.

The funds in the sample managed to provide positive CS returns in nine out of twelve years, while they had negative CT returns also in nine out of twelve years. This corresponds with the results further in the paper, that the hedge funds have positive selection abilities but there is no evidence that they can time the market.

IV. RESULTS

When a four factor Carhart regression was run on the equal weight returns, the hedge funds had significant alpha of 26bps per month. However, when the returns of the portfolios are value weighted, the alpha disappears and becomes insignificant. This is a clear indication that the smaller portfolios by value outperformed the larger portfolios. It should also be noted that the HML coefficient changes from positive to negative when we switch from equal weighting to

value weighting. This suggests that smaller weighted portfolios have a value tilt, while the higher weighted portfolios have the opposite.

The four-factor Carhart regression on the equal weight CS returns reduces the alpha estimate by 5bps a month. However, as we would expect there is no significant weighting on any of the size, value or momentum factors. The characteristic benchmarks account for these factors very well and we are left with a very small market beta.

When the four-factor Carhart regression is run on the CT returns, the estimated alpha is negative, but is insignificant. This provides evidence that the managers of the portfolios have the ability to select individual securities but no ability to systematically alter the size, value or momentum characteristics of their portfolios to positive effect.

When a fifth explanatory variable is added to the four factor Carhart regressions, there is further evidence that the size and concentration of the portfolio have significant effects on selection ability.

As predicted earlier, and shown in Table 8, the total value of a portfolio has a significant negative correlation with the ability of the manager to select securities that perform better than a matched benchmark.

Also, the overall concentration of the portfolio (HERF) is less significant than the concentration of the portfolio in sectors or industries (HSEC & HIND). This suggests that a manager’s commitment to utilize industry specific knowledge is more valuable than a manager's commitment to run a smaller concentrated portfolio that is spread out over more industries.

To further verify the difference in stock selection performance between managers with high value portfolios and those with low value portfolios, the portfolios were separated into value deciles and quintiles. At statistically significant levels, the portfolios from institutions with less total dollar value outperformed. When controlled for the characteristic benchmarks and the four factor regression, the lower valued quintile outperformed the highest quintile by 23 bps a month. The correlation was greater than 0.72 for the deciles and was significant at the 0.05 level.

As shown in Table 9, there is weak evidence that the concentration of the portfolio irrespective of industry or sector has a positive effect on CS. Only the Spearman coefficient on the deciles is consistently positive, with more concentrated portfolios having the higher CS. However, the top decile does not perform significantly better than the bottom decile in the CAPM or Carhart regressions. Essentially, the same results hold for MaxWeight in unshown results.

Surprisingly, given the significance of the HIND variable as an addition to the four-factor regression on CS, there is again weak evidence that more industry concentrated portfolios had higher CS. The same conclusions come from the unshown results for the HSEC regressions.

If the MaxWeight position is compared to the whole portfolio, no significant improved CS performance is shown. The same result holds for the top quintile MaxWeight positions.

Increased positions performed significantly better than positions that were decreased over the quarter, but remained in the portfolio. The quarterly returns were applied to the previous filings positions and compared to the reported position sizes in the newest filing. This gave an expected position if the manager had not changed the position. Positions that were greater than this simulated position value were deemed increased positions and positions less than the

simulated position value were deemed decreased positions. The results were even better for new positions when compared against terminated positions. This provides evidence, that at the margin, the managers do provide value in their changes to the portfolio from one quarter to another.

The performance of the increased positions portfolios correlated positively with the concentration of the portfolio. Using either the concentration by industry or the maximum weight in the portfolio as a measure of concentration increases the four -factor adjusted CS measure to between 49 and 57bps a month. The Spearman coefficient is statistically significant for all the different measures of performance for both concentration methods. The increased positions portfolios in the top MaxWeight quintile and decile outperform the bottom quintile and decile by a significant amount. The more concentrated portfolios seem to be loading on larger, low book to market, and low momentum stocks, as the 4-factor adjusted CS is consistently higher than the unadjusted CS measure.

There is not enough evidence to support that new positions outperformed the terminated positions as concentration increases. The Spearman coefficients are positive but insignificant.

There is no evidence that previous returns predict future excess returns. Portfolios sorted on the previous twelve months of raw performance or CS performance and rebalanced quarterly were constructed. The Spearman coefficient is negative for some measures of performance and insignificant for others. The top quintile shows no evidence of outperforming the bottom quintile. The same results hold if the past three years of performance are used to sort the portfolios.

Table 17 reinforces the lack of persistence. Although, the best performers did have a higher propensity to be the best performers in the next year, they also had a higher propensity to be among the worst performers as well. The same logic applies, to a lesser extent, to the worst performers; they have an increased probability of underperforming but also an increased probability of being among the best performers.

The dynamic is illustrated by Table 18. The best and worst performers have a higher probability of being the most concentrated portfolios. The concentration of the portfolio leads to a higher variance in CS performance. More concentrated portfolios increase the odds of being among the best performers and the odds of being among the worst performers.

V. CONCLUSIONS

Here is a summary of the results.

H1: There is a negative correlation between the value of a portfolio and the selection ability demonstrated by that portfolio. This result seems intuitive; an increase in the total amount of funds that need to be invested reduces a managers opportunity set for meaningful investments.

H2: There is no indication that the top position of the portfolio performs better than the rest of the portfolio. This result held even when only the most concentrated positions were considered. One explanation possible for the difference in this result between hedge fund managers and mutual fund managers is that hedge fund managers are already invested farther away from the market portfolio than their mutual fund peers, such that they have no significant restrictions on the weights of their positions.

H3: Increased positions exhibit a significant performance advantage over decreased positions. New positions show even higher returns over terminated positions. Increased positions for more concentrated portfolios show higher returns than in less concentrated portfolios. The changes in public hedge fund portfolios do have predictive ability for at least the next quarter. It was not studied if the public could mimic these, as returns were taken as of the beginning of the quarter, while the companies have up to 45 days to file. There are also amendments that are filed past the 45-day limit.

H4: More concentrated portfolios outperform less concentrated portfolios. The result is true if the individual positions are used as weights or if the GICS classifications of the securities are used. This implies that managers who concentrate by industry exhibit more selection skill, and managers who concentrate on fewer positions exhibit the same skill. It was also shown that concentrated managers had a higher chance of being among the worst performers for a year, despite the higher expected CS performance.

Characteristic	***Mutual Fund Previous Work***	***Hedge Fund Previous Work***	***Hypothesis***	***Result***
Top Position will Outperform	Significantly Positive (Cohen, Polk, Silli 2008)	No Outperformance (Griffin, Xu 2009)	Positive	No Outperformance
Positive Fund Flows Outperform	Significantly Positive (Cohen, Polk, Silli 2008)		Positive	Significantly Positive

More Concentrated Outperform	Significantly Positive (Kacperczyk, Sialm, Zheng 2005)		Positive	Significantly Positive
Selection Ability	Present, but does not cover fees (DGTW 1997)	Not significantly different from mutual Fund (Griffin, Xu 2009)		Positive, average does not cover fees
Timing Ability	No Ability (DGTW 1997)			No Ability
Persistence	No persistence (Carhart 1997)			No persistence
Small Value vs. Large Value			Small Value Better	Small Value Better

The managers did not exhibit the ability to time the characteristics of their portfolios between small to large capitalization, low to high book to market or low to high momentum.

Although, smaller portfolios and concentrated portfolios are expected to exhibit higher returns, there was little evidence of persistence in the raw returns or the CS performance. High returns in one year, implied a higher chance of again being among the best performers but also an increased chance of being among the worst performers.

The most concentrated portfolios had CS returns of 49 bps a month. Annualized, the excess returns are just over 600 bps a year. Transaction fees and the average asset under management fee of less than 200 bps likely do not reach 600 bps. It appears, that the most concentrated portfolios exhibited enough selection ability in the sample period to justify their

premium fees. However, there are many factors, including the short book, net exposure, gross exposure and any other asset classes, that have not been included in this study that affect the profitability of a hedge fund investment.

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Table 1. Holdings per Institution. Summary, by year, of the number of unique holdings for a given quarterly filing date per institution. The second column is weighted by portfolio value.

Year	Weighted Ave. # Holdings	25%	75%	Ave. # Holdings	Min	Median
2000	175.0	28.9	114.4	91.6	9	58.5
2001	237.6	29.8	105.1	92.3	9	54.8
2002	238.8	32.6	114.9	100.2	8	56.8
2003	230.2	29.0	120.3	102.5	8	55.8
2004	232.9	29.6	112.0	107.4	8	54.8
2005	255.0	28.2	111.5	110.0	8	48.0
2006	336.4	27.8	108.2	115.1	8	51.5
2007	342.6	27.3	110.2	112.1	8	50.0
2008	306.6	23.6	93.9	97.0	8	44.0
2009	291.0	27.1	112.1	108.1	8	48.0
2010	295.8	29.0	118.8	117.9	8	48.8
2011	285.3	27.7	121.9	116.1	8	51.0

Table 2. Holdings Quintiles. Summary, by year, of the average size, book to market and momentum quintiles (columns 2 through 4) and the same categories weighted by portfolio value (columns 5 through 7).

Year	Size	BM	Mom	Weighted Size	Weighted BM	Weighted Mom
2000	3.87	2.57	3.50	4.27	2.23	3.88
2001	3.76	2.68	3.03	4.11	2.69	3.05
2002	3.54	2.64	2.89	4.06	2.67	2.96
2003	3.40	2.77	3.25	4.01	2.75	3.24
2004	3.39	2.67	3.24	3.90	2.72	3.20
2005	3.29	2.62	3.05	3.86	2.72	3.10
2006	3.31	2.64	3.09	3.86	2.73	3.07
2007	3.37	2.64	3.10	3.89	2.71	3.18
2008	3.48	2.65	3.10	3.98	2.67	3.25
2009	3.56	2.82	3.10	4.13	2.85	3.21
2010	3.52	2.79	3.03	4.12	2.86	3.09
2011	3.52	2.93	3.05	4.09	2.98	3.08

Figure 1. Institutions in Sample by Date. Number of institutions in the sample, which qualify for inclusion, by filing date.

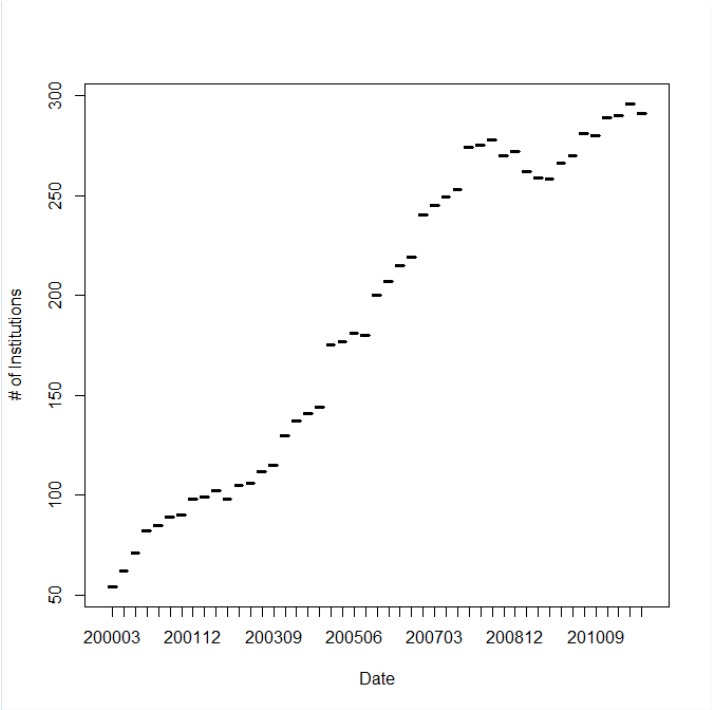

Figure 2. Total Value of Holdings (in millions) in Sample. Sum of portfolio values in the sample, which qualify for inclusion, by filing date.

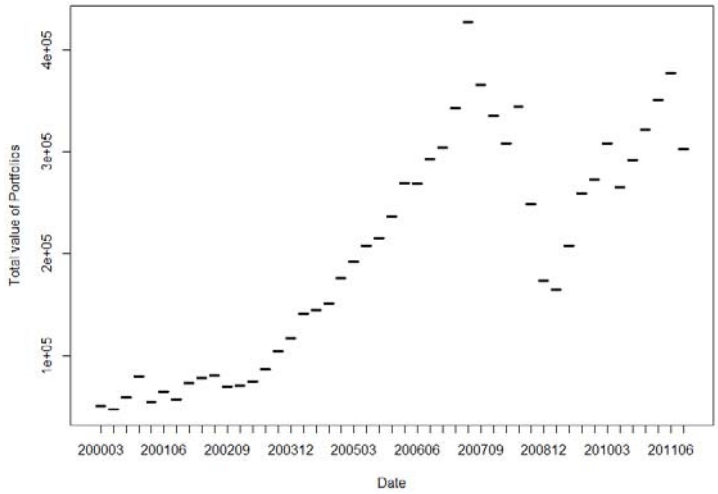

Figure 3. Last Day in Sample for Institutions. Count of last date in which institutions were included in the sample.

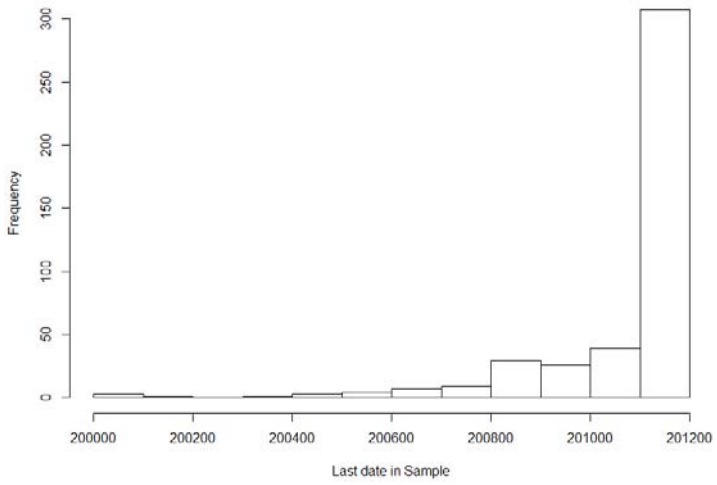

Table 3. Distribution of Return Quintiles Prior to Last Filing. First row is the percentage of institutions, who left the sample, in each respective previous twelve months of gross return quintile. Second row is the same sorted by the previous twelve months of CS.

Previous Twelve Month Return Quintile	1	2	3	4	5
% of Institutions	30.9%	14.4%	12.2%	19.4%	23.0%
Previous Twelve Month CS Return Quintile	1	2	3	4	5
% of Institutions	27.3%	15.8%	15.8%	20.9%	20.1%

Table 4. Correlation Between Explanatory Variables. Pair wise correlation between the concentration and portfolio value variables.

	Value	MaxWeight	Herfindahl	SectorHerfindahl	IndustryHerfindahl
Value	1.00	-0.15	-0.14	-0.12	-0.12
MaxWeight	-0.15	1.00	0.96	0.33	0.49
Herfindahl	-0.14	0.96	1.00	0.34	0.50
SectorHerfindahl	-0.12	0.33	0.34	1.00	0.88
IndustryHerfindahl	-0.12	0.49	0.50	0.88	1.00

Table 5. Summary Data for Explanatory Variables. The minimum, mean, median, maximum, 25th percentile and 75th percentile for gross monthly returns, portfolio value, size of largest position and Herfindahl measures.

	Min.	1st.Qu.	Median	Mean	3rd.Qu.	Max.
Monthly Return	-66.62%	-2.82%	1.16%	0.62%	4.48%	46.00%
Portfolio Value (mm)	$25.01	$175.80	$415.70	$1,064.00	$1,097.00	$43,950.00
Max Weight	0.6%	5.6%	9.4%	12.1%	15.2%	99.5%
Herfindahl	0.2%	2.4%	4.4%	6.2%	7.7%	99.1%
Sector Herfindahl	10.9%	16.5%	20.7%	28.7%	29.9%	100.0%
Industry Herfindhal	5.3%	9.2%	12.6%	18.2%	20.0%	100.0%

Table 6. Composition of Mean Month Returns by Year. Breakdown of returns between mean monthly selectivity (CS), timing (CT) and average style (AS) for each year.

Year	CS	CT	AS
2000	0.0085	-0.0390	0.0283
2001	-0.0002	-0.0011	-0.0003
2002	0.0014	-0.0135	-0.0021
2003	0.0047	0.0444	-0.0152
2004	0.0026	-0.0168	0.0293
2005	0.0023	-0.0051	0.0124
2006	0.0014	0.0043	0.0076
2007	0.0022	-0.0072	0.0118
2008	-0.0008	-0.0414	0.0048
2009	0.0067	0.0620	-0.0364
2010	0.0002	-0.0078	0.0265
2011	-0.0007	-0.0182	0.0185

Table 7. Four Factor Carhart Regression. First column: Regression of gross monthly returns, weighted by portfolio value, on market excess return (MKTRF), small minus big (SMB), high minus low (HML) and momentum (UMD) . Second Column: The same regression with equal weighted monthly CS. Third Column: The same regression on equal weighted monthly CT. Standard errors are reported in parenthesis.

	Gross Returns, Value Weighted	**CS, Equal Weight**	**CT, Equal Weight**
Alpha	0.00112	0.00211***	-0.00147
	(0.00124)	(0.00055)	(0.0045)
MKTRF	1.07571***	0.02618**	0.99663***
	(0.02917)	(0.013)	(0.10594)
SMB	0.19168***	0.01524	0.02408
	(0.04481)	(0.01997)	(0.16276)
HML	-0.10792***	0.00817	-0.21527
	(0.036112)	(0.0161)	(0.13119)
UMD	-0.01681	-0.00071	-0.0249
	(0.02156)	(0.00961)	(0.07832)

* = p < 0.1, ** = p < 0.05, *** = p < 0.01, number of observations = 141

Table 8. CS Regressions on Portfolio Value and Concentration. The below factors were each added as a fifth explanatory variable to the four factor CS regression from table 7. logVal represents the log of the portfolio value, HERF the individual position Herfindahl, HSEC the sector Herfindahl, HIND the industry Herfindahl and MAXWT the size of the largest position in the portfolio.

	Estimate	t-value	Significance	
logVAL	-0.00257	-5.667	***	
HERF	0.00468	0.532		
HSEC	0.00637	2.311	*	
HIND	0.00862	2.33	*	
MAXWT	0.00967	1.692	.	
Signif. Codes 0 '*' 0.001 '**' 0.01 '*' 0.05 '.' 0.1**				

Table 9. Performance of Portfolios Ranked by Portfolio Value. The portfolios were ranked by portfolio value. The top and bottom quintile and deciles are reported along with the differences respectively. The Spearman coefficient are reported for the decile rankings. RET represents the gross monthly return, CS is monthly, 1-Factor α is the regression of RET on MKTRF, 4-Factor α is the regression of RET on MKTRF, SMB, HML and UMD, CS 4-Factor α is the regression of CS on the same four factors.

				PERFORMANCE BY VALUE RANKING					
	RET	**CS**	**Sign.**	**1-Factor α**	**Sign.**	**4-Factor α**	**Sign.**	**CS 4-Factor α**	**Sign.**
Top 10%	0.0037	0.0008		0.0014		0.0011		0.0010	
Top 20%	0.0042	0.0008		0.0020	*	0.0011		0.0008	
Bottom 20%	0.0081	0.0031	***	0.0058	***	0.0037	***	0.0031	***
Bottom 10%	0.0080	0.0033	***	0.0058	***	0.0035	***	0.0032	***
Top 20% - Bottom 20%	-0.0038	-0.0023	**	-0.0057	***	-0.0044	***	-0.0023	**
Top 10% - Bottom 10%	-0.0043	-0.0025	**	-0.0062	***	-0.0042	***	-0.0022	*
Spearman Coefficient	-0.7333	-0.7697	*	-0.7333	*	-0.6121	.	-0.7212	*

Table 10. Performance of Portfolios Ranked by Herfindahl of Individual Positions. The portfolios were ranked by the individual position Herfindahl. The top and bottom quintile and deciles are reported along with the differences respectively. The Spearman coefficients are reported for the decile rankings. RET represents the gross monthly return, CS is monthly, 1-Factor α is the regression of RET on MKTRF, 4-Factor α is the regression of RET on MKTRF, SMB, HML and UMD, CS 4-Factor α is the regression of CS on the same four factors.

				PERFORMANCE BY HERFINDAHL RANKING					
	RET	CS	Sign.	1-Factor α	Sign.	4-Factor α	Sign.	CS 4-Factor α	Sign.
Top 10%	0.0095	0.0043	*	0.0073	**	0.0060	**	0.0049	*
Top 20%	0.0068	0.0026	*	0.0045	**	0.0038	**	0.0033	**
Bottom 20%	0.0053	0.0014	***	0.0031	***	0.0016	*	0.0012	**
Bottom 10%	0.0050	0.0006		0.0028	*	0.0008		0.0003	
Top 20% - Bottom 20%	0.0015	0.0012		-0.0004		0.0004		0.0022	*
Top 10% - Bottom 10%	0.0045	0.0037	.	0.0027		0.0034		0.0046	*
Spearman Coefficient	0.9030	0.9273	***	0.9030	***	0.9879	***	0.9636	***

Table 11. Performance of Portfolios Ranked by Industry Herfindahl. The portfolios were ranked by the industry Herfindahl. The top and bottom quintile and deciles are reported along with the differences respectively. The Spearman coefficient are reported for the decile rankings. RET represents the gross monthly return, CS is monthly, 1-Factor α is the regression of RET on MKTRF, 4-Factor α is the regression of RET on MKTRF, SMB, HML and UMD, CS 4-Factor α is the regression of CS on the same four factors.

			PERFORMANCE BY INDUSTRY HERFINDAHL RANKING						
	RET	CS	Sign.	1-Factor α	Sign.	4-Factor α	Sign.	CS 4-Factor α	Sign.
Top 10%	0.0065	0.0024		0.0042	*	0.0046	*	0.0040	*
Top 20%	0.0068	0.0026	*	0.0045	**	0.0038	**	0.0033	**
Bottom 20%	0.0053	0.0014	***	0.0031	***	0.0016	*	0.0012	**
Bottom 10%	0.0054	0.0013	**	0.0032	***	0.0017	*	0.0010	**
Top 20% - Bottom 20%	0.0015	0.0012		-0.0004		0.0004		0.0022	*
Top 10% - Bottom 10%	0.0011	0.0011		-0.0008		0.0011		0.0029	.
Spearman Coefficient	0.8061	0.8424	**	0.8061	**	0.9152	***	0.9515	***

Table 12. Performance of Different Portfolio Constructions. First row: The performance of the largest position, by value, minus the whole portfolio. Second Row: The performance of increased positions (from the previous quarter) minus decreased positions, still in the portfolio. Third Row: The Performance of newly initiated positions minus positions present in the previous quarter's portfolio but absent from the current quarter.

		PERFORMANCE OF DIFFERENT PORTFOLIOS					
	RET	CS	Sign.	4-Factor α	Sign.	CS 4-Factor α	Sign.
Max Position - Whole	-0.0009	-0.0003		0.0000		-0.0001	
Increased Positions - Decreased Positions	0.0020	0.0018	**	0.0017	**	0.0016	**
New Positions - Terminated Positions	0.0134	0.0046	*	0.0239	*	0.0054	**

Table 13. Performance of Top Position Ranked by Weight of Top Position. The portfolios were placed in quintiles ranked by the size of the of the largest position as a percentage of the whole portfolio. Each quintiles performance metrics are reported.

	Top Position vs Whole Portfolio By Max Weight Quintile						
	RET	CS	Sign.	4-Factor α	Sign.	CS 4-Factor α	Sign.
1-Smallest Max Weight Quintile	-0.0025	-0.0016		-0.0009		-0.0009	
2	-0.0001	0.0013		0.0003		0.0008	
3	-0.0023	-0.0022		-0.0020		-0.0022	
4	-0.0001	0.0006		0.0008		0.0011	
5- Largest Max Weight Quintile	0.0006	0.0003		0.0016		0.0007	

Table 14. Performance of Increased Positions Ranked by Industry Herfindahl. The portfolios were ranked by the industry Herfindahl. The top and bottom quintile and deciles are reported along with the differences respectively. The Spearman coefficient are reported for the decile rankings. RET represents the gross monthly return of the increased positions, CS is monthly for the increased positions, 1-Factor α is the regression of RET on MKTRF, 4-Factor α is the regression of RET on MKTRF, SMB, HML and UMD, CS 4-Factor α is the regression of CS on the same four factors.

	PERFORMANCE of INCREASED POSITIONS BY INDUSTRY HERFINDAHL RANKING								
	RET	CS	Sign.	1-Factor α	Sign.	4-Factor α	Sign.	CS 4-Factor α	Sign.
Top 10%	0.0076	0.0033	.	0.0053	*	0.0056	**	0.0049	**
Top 20%	0.0087	0.0042	**	0.0064	***	0.0058	***	0.0050	***
Bottom 20%	0.0053	0.0015	***	0.0031	***	0.0016	*	0.0013	***
Bottom 10%	0.0051	0.0011	**	0.0029	**	0.0014	.	0.0008	*
Top 20% - Bottom 20%	0.0034	0.0027	.	0.0015		0.0023		0.0037	**
Top 10% - Bottom 10%	0.0024	0.0022		0.0005		0.0025		0.0041	*
Spearman Coefficient	0.8667	0.8667	**	0.8667	**	0.9758	***	0.9515	***

Table 15. Performance of Increased Positions Ranked by the Size of the Largest Position. The portfolios were ranked by the largest position size as a percentage of the whole portfolio. The top and bottom quintile and deciles are reported along with the differences respectively. The Spearman coefficient are reported for the decile rankings. RET represents the gross monthly return of the increased positions, CS is monthly for the increased positions, 1-Factor α is the regression of RET on MKTRF, 4-Factor α is the regression of RET on MKTRF, SMB, HML and UMD, CS 4-Factor α is the regression of CS on the same four factors.

	PERFORMANCE of INCREASED POSITIONS BY MAX WEIGHT RANKING								
	RET	**CS**	**Sign.**	**1-Factor α**	**Sign.**	**4-Factor α**	**Sign.**	**CS 4-Factor α**	**Sign.**
Top 10%	0.0096	0.0052	**	0.0074	***	0.0062	**	0.0057	**
Top 20%	0.0093	0.0045	***	0.0070	***	0.0059	***	0.0050	***
Bottom 20%	0.0053	0.0011	*	0.0031	**	0.0012		0.0008	
Bottom 10%	0.0057	0.0011	.	0.0035	*	0.0012		0.0007	
Top 20% - Bottom 20%	0.0039	0.0034	**	0.0021		0.0028	.	0.0042	***
Top 10% - Bottom 10%	0.0039	0.0041	*	0.0021		0.0032		0.0050	*
Spearman Coefficient	0.8667	0.9515	***	0.8667	**	0.9030	***	0.9515	***

Table 16. Performance of Top Position Ranked by CS. The portfolios were placed in quintiles ranked by the previous quarter's average CS. Each quintile's performance metrics are reported along with the difference between the top and bottom quintile and Spearman coefficients.

	PERFORMANCE by PREVIOUS PERIOD CS						
	RET	CS	Sign.	4-Factor α	Sign.	CS 4-Factor α	Sign.
1 - Worst Performers past 12 months	0.0073	0.0022	*	0.0051	***	0.0037	**
2	0.0052	0.0014	*	0.0030	**	0.0017	
3	0.0066	0.0023	***	0.0044	***	0.0025	**
4	0.0064	0.0022	**	0.0041	***	0.0026	**
5 - Best Performers past 12 months	0.0065	0.0030	**	0.0042	*	0.0025	.
Top Quintile - Bottom Quintile	-0.0008	0.0008		-0.0027		-0.0030	*
Spearman Coefficient	-0.3000	0.8000		-0.3000		-0.1000	

Table 17. Transition Matrix for CS Quintiles. The portfolios were ranked by the previous twelve month's average CS. The table shows what percentage of each quintile subsequently ended up in the same quintile and every other quintile when the portfolios were ranked by CS over the next twelve months.

		NEXT TWELVE MONTH CS QUINTILE				
		Worst Performers - 1	2	3	4	Best Performers - 5
	Worst Performers - 1	24.3%	17.7%	15.1%	20.7%	22.3%
TRAILING TWELVE	2	15.1%	27.1%	26.8%	18.1%	13.0%
MONTH CS QUINTILE	3	17.4%	26.7%	22.5%	18.3%	15.1%
	4	16.9%	21.5%	19.2%	23.1%	19.2%
	Best Performers - 5	27.2%	11.0%	16.3%	17.6%	27.9%

Table 18. Comparison of Herfindahl Quintile and CS. Portfolios were ranked by the individual position Herfindahl at the beginning of the twelve month period. Then ranked by the subsequent twelve month CS.

		HERFINDAHL				
		Least Concentrated - 1	2	3	4	Most Concentrated - 5
	Worst Performers - 1	12.7%	16.4%	19.3%	24.1%	27.5%
TRAILING TWELVE	2	28.1%	24.2%	19.2%	15.5%	13.1%
MONTH CS QUINTILE	3	30.7%	22.7%	19.4%	14.9%	12.2%
	4	21.2%	21.4%	21.2%	20.1%	16.1%
	Best Performers - 5	8.3%	15.0%	20.4%	24.9%	31.4%