

Diversification versus Concentration . . . and the Winner is?

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Abstract: Diversification has its obvious benefits but its pursuit can involve a trade-off between risk-controls and returns. We investigate this trade-off by examining the relative performance of diversified versus concentrated portfolios both formed on the basis of the same stock preferences. Using US equity mutual funds as our data base, we establish that the concentrated portfolios achieve the better performance. This highlights the potential for investors to diversify across concentrated funds rather than have the funds do the diversification themselves. It also highlights that the stocks selection skills of the managers may be lost by their portfolio construction endeavours.

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In the blue corner we have the great diversifiers ably led by Harry Markowitz, Bill Sharpe and other protagonists from the Modern Portfolio Theory (MPT) school. In the red corner we have the celebrated concentrators including John Maynard Keynes, Warren Buffet and a score of other like-minded practitioners. The concentrators fell out of favour among the investment community over 50 years ago when the MPT people showed us the advantages of diversifying our asset holdings. They demonstrated that by so doing we reduced the risk of holding these assets and if we choose not to diversify that we would be paying too much for them. Somewhat persuaded by these arguments, but also driven by their clients, the professional fund managers moved to holding widely-diversified, risk-controlled portfolios (i.e. from being concentrators to diversifiers).

It was only a decade or so after this transition began that many of the great diversifiers began telling the professionals that they were not doing a good job for their clients. That as a group they were only average and that they actually detracted from their clients' wealth once account was taken of fees. Still, diversification remained the main game into the new millennium with little or no connection being made between the apparent lack of skills displayed by the professional managers and the mantra of diversification. With the bursting of the dot.com boom in early 2000s, we saw an increased interest in more concentrated portfolios under the guise of absolute return funds driven by investors seeking a continuation of the high returns that they had been enjoying for the previous two decades. Along with this shift in demand we saw a re-emergence of the debate as to the relative benefits associated with running diversified versus concentrated portfolios.

It is this debate that we take up in this paper where we use US equity mutual fund data to examine how the managers would have performed if they pursued more concentrated portfolios. We exclude funds that are already concentrated and for the remainder identify the manager's preferred stocks. We then form concentrated portfolios based on these preferred stocks where the size of these portfolios range from 5 to 30 stocks. As would be expected the more concentrated portfolios, the higher its absolute risk (as measured by the standard deviation of its returns) and also its risk relative to the benchmark (as measured by its tracking error). More importantly, we find that the concentrated portfolios outperform both the actual performance of the fund and its benchmark. Risk-adjusted performance also tends to be higher for the more concentrated portfolios as compared to the actual portfolios and the benchmark.

These findings are basically good news for the professional managers who have long been criticised for their performance. The evidence suggests that they are actually good at what they spend most of their time doing, selecting stocks. The problem is that they are stripped of this edge due to having to depart from their stock preferences in the interests of diversification and risk-control. This is

not to downplay the importance for investors of running a diversified portfolio across all of its investments but it does question the current practice of requiring a high degree of diversification of individual managers.

The remainder of the paper is structured as follows. In section 1, we outline the nature of the issue that we are addressing drawing where possible from the available literature. Section 2 is devoted to outlining our data and the methods that we employ in our analysis. We present and discuss our findings in Section 3. Section 4, provides us with the opportunity to summarise.

Section 1: Background

The major advance of our understanding of risk came with the work by Harry Markowitz (1952) on portfolio theory. This work completely changed our view on portfolio construction by demonstrating that we should no longer assess risk at the level of individual securities but rather in terms of the contribution that each security makes to the total portfolio. The investment process involves assessing the potential of the securities in our universe to generate returns and then combining these securities in a portfolio to generate acceptable risk-return outcomes. The work of Markowitz switched our attention back to the portfolio construction phase where risk plays a much more equal role to returns in determining where the funds are invested. In particular, we learned from MPT the need to diversify our portfolios and by so doing achieve risk-reduction. By not diversifying we would be taking on risks that are not compensated by the market and so effectively paying too much for our securities.

The need to embrace diversification was not only accepted by the funds management community because they were convinced that it was a good idea but also because it rapidly came to be accepted as prudent practice by the regulators and their clients. For example, it is embedded in the “prudent man” principles that govern fiduciaries¹. As a consequence, we find that almost all product description statements or investment mandates that govern how funds are invested will have many explicit and implicit statements that drive the manager towards holding diversified portfolios. Hence over the second half of the 20th century we moved to a world governed by the diversifiers.

The question that we pose here is whether the benefits associated with diversification come at a cost in terms of foregone returns? The answer is potentially yes as there may be a conflict between investing in the stocks that are

¹ The Employee Retirement Income Security Act (“ERISA”) was enacted into law in the US in 1974. ERISA enforces the administration of retirement and benefit plans. ERISA has a Diversification Rule – A fiduciary must diversify investments in order to minimize risk of loss unless it would be considered prudent to not diversify investments. 29 U.S.C. §1104 (a)(1)(C).

cheap and investing in stocks that bring the greatest diversification advantages to the portfolio. It is important to note here that there can be no conflict if markets are efficient as then there are no market mispricings to exploit and so portfolio construction is the only game in town. Of course many would disagree about the efficiency of markets or otherwise why would so many resources be devoted to identifying mispriced stocks. Perhaps the best expression that we have of the dangers of diversification comes from one of the greatest intuitive investment thinkers of all time, John Maynard Keynes, who wrote to a friend in 1934:

“As times goes on, I get more and more convinced that the right method of investment is to put large sums into enterprises which one thinks one knows something about and in the management of which one thoroughly believes. It is a mistake to think one limit’s one’s risk by spreading too much between enterprises about which one knows little and has no reason for special confidence.”

The insights provided by Keynes have not been lost on many of the greatest investors of our time, such as Warren Buffet and George Soros, who are firmly in the camp of the concentrators. Of course, the one feature that is common to all of the well regarded concentrators is their ability to choose stocks. Without this special ability, a manager would be well-advised to limit the bets that they take or probably better, offer index funds. The reality is that the majority of funds are invested with active managers which either suggests that there is a surfeit of managers with the ability to outperform and/or only a weak relationship between a manager’s stock selection ability and his willingness to take bets. On this latter point, Bird et al. (2011) have demonstrated that given investors tend to chase outperformance, even managers with negative ability have strong incentives to take sizable bets in the hope of fluking some significant outperformance. Therefore we cannot conclude that the fact that we have many managers willing to take active bets as being indicative that we have a large number of managers with the ability to identify mispriced stocks.

Perhaps to obtain better insights into the true ability of active managers we should explore the available literature of which there is ample. The studies of the performance of active funds are numerous dating back to the mid-60s with the general finding being that as a group they underperform their benchmark once account is taken of their management fees and the other incremental costs associated with employing active managers (Jones and Wermers, 2011). Of course, the fact that active management as a whole fails to outperform does not preclude that many managers will outperform their benchmark over any particular measurement period². However given that most managers are appointed on the

² Jones and Wermers, (2011) recommend the taking account of the following four factors when trying to identify superior managers: (i) past performance, (ii) macroeconomic forecasting, (iii) fund/manager characteristics, and (iv) analysis of fund holdings.

basis of their past performance, this will only translate into value-adding future outperformance for investors if it proves that there is a high level of persistence in manager performance (Gohal and Wahal, 2008). Again the empirical evidence suggests that there is little persistence in fund performance which adds to the argument that investors would be well advised to delegate the majority of their funds to low costs passive management (Busse et al., 2010).

The implications commonly drawn from these findings is that (i) managers as a group underperform on an after-fees basis and (ii) markets are efficient given that highly-paid professional managers are unable to identify mispriced stocks. These issues are nowhere near as clear-cut as one might think with one possible interpretation of the empirical findings being that securities are often mispriced and funds managers are quite good at identifying these mispricings but that the profit-making potential of this ability is either diluted or destroyed by a number of factors including the risk controls introduced at the portfolio construction stage.

The other particularly relevant literature comes from the recent work on the relationship portfolio concentration and fund performance. The common finding of most of this research is that on average the more concentrated portfolios outperform their benchmarks on an after-fees basis (Kacperczyk et al., 2005; Brands et al., 2005; Cremers and Petajisto, 2009). Bird et al. (2011) have shown that it is optimal for the more skilled managers to run the more concentrated portfolios suggesting that there may be self-selection with the better managers running the more concentrated portfolios and achieving the better performance. Cohen et al. (2010) show that the absolute best idea of a fund manager (i.e. the stock that they like most) systematically outperforms the portfolios actually run by the manager.

Overall, the results from prior research raise the possibility that if fund managers invested in concentrated portfolios based on their best ideas, they would significantly improve their performance over that realised from investing in more diversified portfolios. The remainder of this paper is aimed at providing more clarification on the important contest between the diversifiers and the concentrators. The determination of the winner of this contest will have several important implications. The first being as to how investors should optimally use fund managers when structuring their investments. An option being that they allow the managers to run concentrated funds and then to combine the funds in a way to realise the diversification benefits. Our findings will also provide insights into the contributions made by fund managers. The possibility that the average manager has above average stock selection skills brings into question the conclusion drawn from the fund performance literature that as a group they offer little to clients who would be well advised to invest via index funds. A third important implication of our findings relates to the efficiency of markets. If managers display the ability to outperform running concentrated portfolios, then this suggests that they can consistently identify mispriced stocks. Finally, if we do

find evidence to suggest that managers are good at stocks selection, then the question is why does this not translate into better overall investment performance. The suggestion is that the benefits from their superior stock selection skills are lost in the portfolio construction stage of the process as a result of the inclusion of many stocks in the portfolio for risk-control purposes rather than because they are considered mispriced.

Section 2: Data and Methodology

The Data

Our data set extends from 1999 to 2009 with the majority of the data being collected on a quarterly basis. All but the holdings data for the funds is obtained from CRSP Survivor-Bias-Free US Mutual Fund Database. Fund Holdings data is obtained from Thomson Reuters S12 Mutual Fund Holdings.³ Data for the indices used are obtained from Russell Company and Standard and Poors. Finally we obtained our stocks returns data from Compustat. We make use of the CRSP/Compustat Merged Database (CCM) to link the stock data to funds information to perform our analysis. The data for the four factors used in the Carhart model were obtained from Kenneth French's website.

Sample and Data Selection

The fund selection process began by collecting quarterly data for actively managed funds from the universe of CRSP Survivor-Bias-Free US Mutual Fund Database.⁴ Because we want to deal with diversified portfolios, we deleted from any funds with an average holding of less than 40 stocks⁵. Some sample statistics for our final sample of 4,723 actively managed are reported in Table 1. The average fund size is \$306m with an average fund holding of more than 150 stocks. Our sample contains a lot of embryonic funds with very low funds under management and relatively low stock holdings. When growth and value managers are evaluated separately, the value managers are slightly larger both in terms of funds under management and also stock holdings. Finally, Table 1 reports that there are 1659 institutional funds and 3069 retail funds in the sample. While the average retail fund tends to have larger funds under management, the median institutional fund has slightly higher fund under management than the median retail fund. The finding may reflect that institutional investors are more aware that there is an optimal fund size above which fund returns will decrease.

³ Given that CRSP fund holdings data was only available from 2003, the use of Thomson Reuters S12 Fund holdings data enables us to significantly expand the sample period.

⁴ Consistent with other studies in the mutual fund area, we use the funds' strategic objective provided by CRSP to filter our sample. Since CRSP provide several sets of strategic objectives (namely Strategic Insights and Lipper Investment Objectives) and neither set of strategic objectives data covers the entire sample period, we use a combination of Strategic Insights and Lipper Investment Objectives to filter our final sample. We selected funds with the following Lipper Investment objectives: G, GI, LSE, MC, MR and SG. Funds from the Strategic Insights objective codes, we selected AGG, GRI, GRP, ING, SCG and GMC.

⁵ The literature suggests that the majority of the benefits of diversification are obtained by the time that the portfolio size has reached 40 securities (Tang, 2004)

Table 1 Summary Statistics

This table shows the summary statistics of the sample of mutual funds in the period 1999 to 2009. Fund size represents the total net asset of the company. We report the characteristics of the fund size fund size and the average number of stocks held by the funds. The table contains statistics for the full sample as well as subsample of funds. We classify managers into Growth, Value and Style Neutral based on the designated benchmark index. For example, the sample of Value managers contains all the funds that have a value index (i.e. S&P400 Value, S&P500 Value, S&P600 Value, Russell 1000 Value, Russell 2000 Value and Russell Mid Value) as its designated benchmark. From the sample of active funds, we were able to classify the Institutional funds in our sample through the use of the institutional fund identifier (inst_fund) from CRSP. The remainder of the sample of funds are classified as Retail mutual funds.

	<i>Full Sample</i>		<i>Small</i>		<i>Large</i>		<i>Growth</i>		<i>Value</i>		<i>Institutional</i>		<i>Retail</i>	
	Fund Size (\$'M)	Number Of Stocks	Fund Size (\$'M)	Number Of Stocks	Fund Size (\$'M)	Number Of Stocks	Fund Size (\$'M)	Number Of Stocks	Fund Size (\$'M)	Number Of Stocks	Fund Size (\$'M)	Number Of Stocks	Fund Size (\$'M)	Number Of Stocks
Mean	306	153	7	128	867	184	302	95	381	110	214	184	355	138
Median	50	87	6	86	293	93	43	80	50	79	54	93	46	84
Standard Deviation	1614	257	4	148	2709	329	1241	78	1490	119	913	314	1747	224
Min	1	41	1	41	93	41	1	41	1	41	5	41	1	41
Max	60890	3561	16	1891	60890	3561	24288	933	25101	1653	30647	3501	59756	3561
Number Of Funds	4723		1574		1575		1491		835		1654		3069	

The Methodology

Benchmark Assignment and Active Position

An essential part of our analysis is the assignment of a benchmark to each fund in our sample. We do so using a measure that we refer to as the fund's active position which is half the aggregate of the absolute differences between the fund's holdings and the index weight for each stock. Consistent with Cremers and Petajisto (2009), we estimate the level of active management by comparing the holdings of a mutual fund with the stocks weightings of 18 different indices. We collected index compositions data for a total of 18 equity market indexes of which nine belonged to the Russell family (namely the Russell 1000, Russell 2000, and Russell Midcap indexes, plus the value and growth components of each) and the other nine being sourced from Standard and Poors (the S&P400, S&P500 and S&P600 indexes, plus the value and growth components of each)⁶. We determine each quarter the index that most closely tracks each fund's actual portfolio (i.e. the index that gives it the smallest active position). As a consequence over the life of each fund we have a benchmark index assigned each quarter. We then allocate to each fund as its benchmark, that index that was chosen in the greatest number of quarters. In this way, we are able to maintain the principle of choosing the index that is closest to the actual holdings while being able to maintain a single benchmark over the life of the fund.

Portfolio Weights and Returns

Concentrated Portfolio Construction

Each quarter, we measure the difference between each fund's portfolio holdings and the holdings of the assigned benchmark index (the "bet size" for each stock)⁷. The differences can be thought of as a measure of the degree of confidence that the manager has for that stock to yield superior returns. We sort these bets by size from the largest. We then build each quarter concentrated portfolios varying in size from five stocks (Top 5) to 30 stocks (Top 30) where the stocks included are based upon these rankings (i.e. the top five stocks in the Top 5 portfolio, and so on).

Portfolio Weights and Returns

We use two sets of portfolio weights in our analysis, equal weighting and "conviction" weighting. Equal weighting assumes that managers will invest at the beginning of each quarter an equal proportion of funds in each stock within the portfolio. For example, a manager will invest 10% of funds in each stock within the Top 10 concentrated portfolio. In the case of equal weighting, the portfolio returns each quarter will be the average quarterly returns of the stocks within the portfolio.

We also implement a second set of weights, "*conviction weights*", for the concentrated portfolio. We believe that conviction weights are informative because it takes into

⁶ We wish to thank Russells and Standard and Poor for providing this data

⁷ We also repeated the analysis using the S&P500 as the index for all funds. The basic results were unchanged to those reported in this paper.

account both the index and the strengths of the manager's opinion for each stock. The conviction weight is calculated as follows:

$$\text{Conviction Weights}_{i,t} = \text{IndexHoldings}_{i,t} + (1 - \text{SumOfIndexHoldings}_{i,t}) * \left(\frac{\text{BetSize}_{i,t}}{\text{SumOfBets}_t} \right) \text{where}$$

- *Indexholding_{it}* is the index weight assigned to stock *i* in quarter *t*
- *SumofIndexholdings_t* represents the aggregate of the index weights for each stock included in the portfolio in quarter, *t*
- *BetSize_{it}* represents the difference between the fund's actual holdings of stock *i* in quarter *t* and the index weight for that stock and the holdings in the benchmark index
- *SumOfBets_t* is the sum the *BetSize_{it}* for the stocks included in the portfolio

The quarterly returns of the concentrated portfolios are simply the sum of the weighted average of the quarterly returns of all the stocks in the portfolio where the weights are determined by the conviction weights.

Portfolio Performance and Excess Returns

The quarterly returns for the various portfolios are calculated on the presumption that an equal amount is invested in each fund for which we have a portfolio for that quarter. For example, if we have portfolio for a 1,000 funds for a particular quarter, then we assume an investment of 0.1% in that fund for that quarter. Therefore, the return for the portfolio for the quarter is the average of the quarterly returns for each of the funds included that quarter. In this way, we calculate the returns for the Top 5 through to Top 30 portfolios over the 44 quarters in our sample. Using these returns we can then calculate the annualised returns for each portfolio, its standard deviation and its Sharpe ratio⁸.

As well as calculating the absolute return for each concentrated portfolio each quarter, we also calculate its excess return. These excess returns are calculated relative to the following three sets of returns: the fund's actual returns, the returns on its own assigned index and the returns on the S&P500 index. Using the same procedure as previously, we use these quarterly excess returns to calculate the annualised excess return for each concentrated, Top 5 through to Top 30, its tracking error (which is the standard deviation of the quarterly excess returns) and its information ratio (which is the annualised excess return divided by its tracking error). Finally we used 4-factors model developed by Carhart (1997) to determine risk adjusted alphas for the concentrated portfolios and to examine their risk exposures.

⁸ See Sharpe (1966)

Section 3: Findings

Absolute Returns

The focus of this study is on determining how a fund would have performed if the manager had restricted the investments to his/her preferred stock's. Portfolios are chosen each quarter using the methods described in the previous section. The ones that we examine are those composed of the managers, five, 10, 15, 20 25 and 30 most preferred stocks. In Table 2 we report the annual return, standard deviation and Sharpe ratio for a portfolio where an equal amount is invested in all funds for which we have a quarterly portfolio. The weights assigned the stocks in the individual portfolios are what we call conviction weights which reflect the strength of the manager's preferences for each stock⁹. We also provide the same information in Table 2 of the performance of actual portfolios held by the funds (All Funds) and of a portfolio consisting of the benchmarks assigned to each fund¹⁰.

Table 2: Returns, Standard Deviations, Sharpe Ratios for the Total Sample

Table 2 reports the total returns of the concentrated portfolios. Each quarter, we formed the concentrated portfolio by measuring the difference between each fund's portfolio holdings and the holdings of the assigned bench mark index. The differences can be thought of as the "Bets" against the benchmark. These bets are the stocks that the managers have the greatest confidence in yielding superior returns. We sort these bets by size from the largest. The concentrated portfolios Top5 to Top30 comprised of the largest 5 bets to the largest 30 bets respectively. We measured the total returns and standard deviation as of these portfolios as the mean total returns and standard deviations of the funds across time.			
Total Returns - Full Sample			
Conviction Weights Against Own Index			
Portfolios	Total Returns (annualised)	Standard Deviation (annualised)	Sharpe Ratio
Top 5	10.77%	26.33%	0.277
Top 10	9.39%	23.40%	0.255
Top 15	8.67%	21.83%	0.239
Top 20	8.12%	20.65%	0.228
Top 25	7.78%	19.79%	0.219
Top 30	7.44%	19.13%	0.210
All Funds	6.30%	19.51%	0.169
Own Index	5.05%	19.96%	0.080

⁹ The method for calculating these conviction weights is described in Section 2.

The major insight provided by Table 2 is that the concentrated portfolios as a group outperform both the actual (diversified) portfolios implemented by the funds and also their benchmarks. Further, the more concentrated the portfolio, the better the performance as we see a progressive decrease in realised returns as the concentrated portfolios are expanded from five stocks to 30 stocks. This provides strong evidence that the portfolio construction phase of the investment process is resulting in reduced returns. As one would expect, the concentrated portfolios have higher total risk as measured by the standard deviation of the returns. However, these progressively decrease as the number of stocks in the concentrated portfolios increase. Indeed by the time the portfolio holdings increase to 25 to 30 stocks, the standard deviation for the concentrated portfolios are equivalent to those for the diversified portfolios which is consistent with previous evidence on the number of stocks required to include in a portfolio to gain the majority of the advantages' of diversification. Given our findings on returns and standard deviations, it is not surprising that the concentrated portfolios have a higher Sharpe ratio to those of the actual funds and also the funds' indices. Again, the Sharpe ratio of the concentrated portfolios consistently declines as we expand their portfolio size. All of our findings suggest that we have been effective in using the actual portfolios of the funds to determine the relative preferences of the managers for the stocks that they include in their portfolio. The conclusion that we would draw from the information contained in table 2 is the managers of mutual funds as a group have good stock selection skills but that these are diluted by the portfolio construction process.

Excess Returns

We next evaluate the performance of the same portfolios where we measured the return of the concentrated portfolios relative to both the actual portfolios that they held (i.e. Own Funds) and their own benchmark (i.e. Own Index)¹¹. The results reported in Table 3 present a similar picture to what we saw in Table 2 with both the outperformance and the risk as measured by the tracking error reducing as the concentrated portfolio is diluted. It has to be remembered that these results represent the performance across several thousand mutual funds and so report the performance of the average fund. Again they confirm the ability of the average manager to identify mispriced stocks with the information ratio indicating that they can add value on a risk-adjusted basis.

¹¹ We obtained similar results when we evaluated the excess returns relative to the S&P500.

Table 3: Excess Return, Tracking Error and Information Ratio for Total Sample

Table 3 reports the excess returns of the concentrated portfolios. Each quarter, we formed the concentrated portfolio by measuring the difference between each fund’s portfolio holdings and the holdings of the assigned bench mark index. The differences can be thought of as the “Bets” against the benchmark. These bets are the stocks that the managers have the greatest confidence in yielding superior returns. We sort these bets by size from the largest. The concentrated portfolios Top5 to Top30 comprised of the largest 5 bets to the largest 30 bets respectively. We reported the excess returns of the portfolios in comparison to the fund’s actual performance and the performance of the benchmark index. Tracking error is measured as the standard deviation of the excess returns. Information Ratio is calculated as the. We reported the excess returns, tracking error and information ratio as of these portfolios as the mean excess returns, tracking error and information ratio of the funds across time.

	Conviction Weighted Portfolios					
Concentrated Portfolios	Relative to Own Fund			Relative to Own Index		
	Excess Return (% pa)	Tracking Error (%pa)	Information ratio	Excess Return (% pa)	Tracking Error (%pa)	Information ratio
Top 5	3.75	16.49	0.23	5.26	17.68	0.30
Top 10	2.41	12.94	0.19	3.90	14.06	0.28
Top 15	1.69	11.00	0.15	3.16	12.12	0.26
Top 20	1.17	9.62	0.12	2.67	10.68	0.25
Top 25	0.83	8.69	0.10	2.30	9.69	0.24
Top 30	0.52	8.04	0.07	1.97	9.00	0.22

Carhart 4-factor Model

The final piece of analysis using our total sample is to subject our concentrated portfolios to the Carhart four-factor model. The dependent variable in our variable is the average quarterly return on our concentrated portfolios derived using each fund’s own benchmark, less the risk-free rate. The risk-adjusted performance as indicated by the constant (alpha) as reported in Table 4 suggests that the outperformance of the concentrated portfolios ranged from slightly in excess of 5.1% pa for the Top 5 portfolio to about 2.1 % pa for the Top 30 portfolio¹². The market beta for the portfolios commences above one for the most concentrated portfolio and quickly falls to be insignificantly different to one as the concentration is diluted. The strongest tilt across the funds is towards strong momentum stocks with much weaker tilts towards small cap and growth stocks. Based on these findings, again it appears that managers have stock selection skills which they do not exploit when building diversified portfolios.

Table 4: Four Factor Model Applied to Total Sample

¹² We conduct time series analysis based upon 43 quarterly observations. The sample size is a constraint on being able to identify significant relationships.

We applied the Carhart four-factor model to the quarterly returns of the concentrated portfolio to control for risks. The Carhart four-factor model coefficients are reported in the table. Rm-Rf is the coefficient associated with the market premium (market returns less the risk free returns), SMB is the size premium (small stocks minus big stocks), HML is the book-to-market premium (high minus low book-to-market stocks) and momentum is the 11 month less one month momentum factor. We reported the coefficients and the p-values in the table below.

Conc. Port.	Four Factor Model : Excess Returns based on Weighting against Own Index									
	Alpha	P-Value	Rm-Rf	P-Value	SMB	P-Value	HML	P-Value	Momentum	P-Value
Top 5	1.246	0.307	1.249	0.088	0.143	0.542	-0.195	0.230	0.405	0.010
Top 10	0.955	0.321	1.168	0.143	0.121	0.515	-0.128	0.319	0.342	0.006
Top 15	0.790	0.339	1.118	0.228	0.111	0.488	-0.090	0.410	0.305	0.005
Top 20	0.680	0.350	1.077	0.371	0.099	0.480	-0.060	0.534	0.275	0.004
Top 25	0.599	0.363	1.044	0.573	0.092	0.468	-0.037	0.670	0.253	0.003
Top 30	0.528	0.386	1.015	0.830	0.088	0.452	-0.020	0.801	0.235	0.003

We plot in Figure 2 distribution of the excess annual returns for the Top 5 and Top 20 concentrated portfolios based on the excess returns over benchmark for each fund included in our sample.¹³ As we have seen previously, both the average and standard deviations of the excess returns decrease as we increase the size of the concentrated portfolio. The values for the percentile cut-offs and the fact that the mean excess return for the concentrated portfolio is much greater than its median highlights are strong indicators that excess returns of the individual concentrated funds are skewed towards the higher returns (i.e. to the right). This is further confirmed by observing that average positive excess return of the funds outperforming their benchmark is much greater than average negative return for those funds that underperform. Therefore, if only 50% of the funds had a positive excess return, the average returns over all managers would also be positive. However, the information provided at the bottom of Figure 1 indicates that this percentage of managers outperforming ranges from 55.65% for the Top 5 portfolio to 53.09% for the Top 30 portfolio¹⁴. In summary, then average return of the concentrated portfolios is positive because (i) the majority of these funds outperform and (ii) those that do outperform on average do better in absolute terms than those that underperform.

The other issue that we would like to address when discussing our whole sample is the timing of the outperformance of the concentrated portfolios. When we analyse their performance over the 11 years covered by our sample, we find that they outperformed for five of these years and underperformed for six. As must be the case given our overall finding of outperformance, their added value in

¹³ The excess returns reported are measured relative to the fund's benchmark.

¹⁴ It would be wrong to use 50% as the point of comparison for the percentage of actual manager's outperforming, The reason be in that on average only 43% of the stocks in the common indices outperform in a particular year which means that 43% of the stocks held included in an index fund would outperform. This makes an outperformance of between 53% and 55+% of our funds look quite impressive.

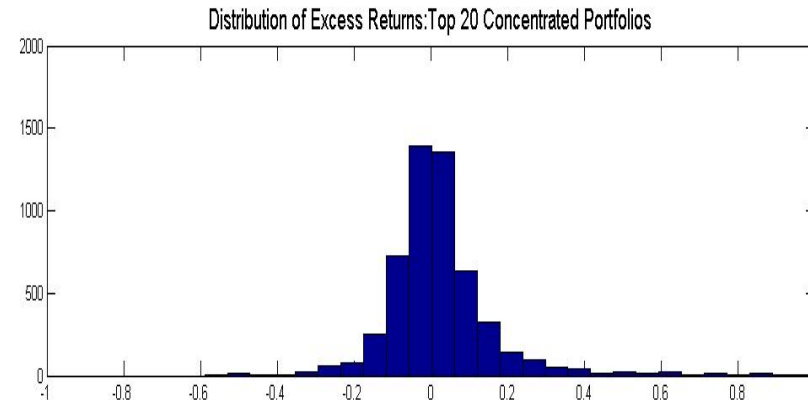
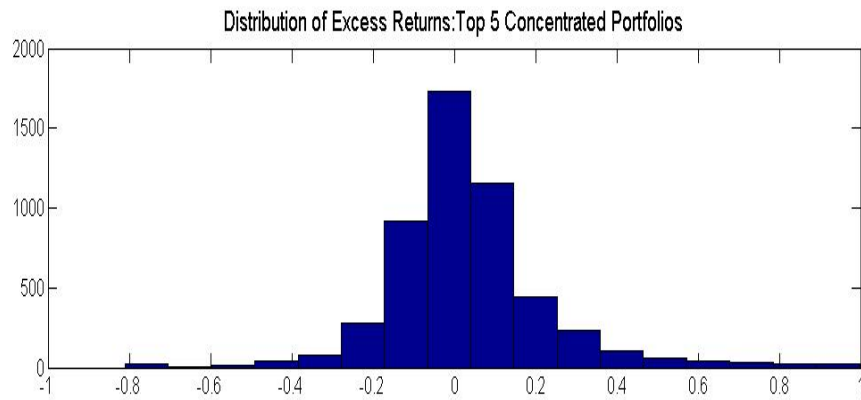
the good years exceeds the detracted value in the bad years. It may not come as a surprise to find that the good years for the concentrated portfolios are confined largely to periods when the market was performing well. This finding is totally consistent with the overall tilt in the concentrated portfolios towards relative small positive momentum stocks which are the types of stocks that tend to during periods of strong market sentiment. This suggests that investors would be best placed favouring concentrated funds when market sentiment is high but switch to more diversified funds when overall gloom descends on markets.

Investment Styles

Of interest is whether our findings over the total sample hold for important sub-sets of the sample. In this case we have repeated much of the analysis where the total sample is divided on the basis into style neutral, value and growth funds¹⁵. In Table 5 we report the annualised return, standard deviation and Sharpe measures for the concentrated portfolios for each style of fund. In addition we provide for each style both the actual returns achieved plus the returns achieved by their benchmarks (with also standards deviations and Sharpe measures for each). All three styles display the same finding as previously with the returns, standard deviations and Sharpe measures reducing as the concentrated portfolios are diluted. By far the greatest returns are realised by the concentrated portfolios operated by the growth managers with their “Top 5” portfolios outperforming their actual performance by almost 8% per annum. However, this very good performance is somewhat facilitated by the fact that growth indices are populated by stocks with high valuation multiples (i.e. “expensive” stocks) making it easier for the growth managers to identify mispriced stocks in their universe. Still it remains impressive that the average growth manager can maintain a relatively good information ratio even for their Top 30 portfolio. In the case of the value and market neutral funds, they can both produce a reasonable performance for their more concentrated portfolios which dissipates at a slightly faster rate than it does for the growth funds¹⁶. We have reported previously that the actual returns are after transaction costs while the other returns are all before transaction costs. Once these are added back to the actual returns it proves that all of the concentrated portfolios of the growth managers handsomely outperform their actual returns 9adjusted for transaction costs and the returns on their benchmark. The story for the style neutral and value managers is not quite as good with their actual performance (adjusted for transaction costs) equating with that of their “Top 20” concentrated portfolio with their more concentrated portfolios still outperforming.

¹⁵ This division is done on the basis of the fund’s benchmark.

¹⁶ We also conducted identical analysis where all performance was evaluated relative to a common index (S&P500). In this case, the performance of the concentrated for the value funds was almost as impressive as that of the growth managers. Consistent with Bird et al (2011), this confirms that the growth managers have an advantage in implementing their portfolios but that the value style brings higher returns than does the growth style (consistent with there being a positive value premium)



Distribution of Excess Returns						
	Concentrated Portfolios					
	Top5	Top10	Top15	Top20	Top25	Top30
Mean	5.82%	4.24%	3.52%	2.88%	2.46%	2.09%
Std Deviation	15.73%	12.02%	10.59%	9.43%	8.53%	7.90%
10th Percentile	-15.21%	-12.84%	-11.03%	-10.17%	-9.50%	-9.35%
25th Percentile	-6.73%	-5.40%	-4.85%	-4.62%	-4.22%	-4.04%
Medians	1.47%	1.32%	1.05%	0.74%	0.73%	0.49%
75th Percentile	11.68%	8.93%	7.93%	6.73%	6.35%	5.87%
90th Percentile	30.49%	22.91%	20.25%	16.83%	15.82%	13.74%
Positive Excess Returns	55.65%	55.01%	54.99%	54.19%	53.89%	53.09%
Mean of Positive Excess Returns Fund	21.49%	16.28%	13.86%	12.25%	11.07%	10.30%
Mean of Negative Excess Returns Fund	-11.63%	-9.18%	-8.15%	-7.44%	-6.95%	-6.64%

Figure 1: Distribution of Excess Returns for Total Sample

Table 5 Returns, Standard Deviations and Sharpe Ratios for Different Investment Styles

Table 5 reports the returns of the concentrated portfolios for managers of different investment styles. We classify managers into Growth, Value and Style Neutral based on the designated benchmark index. For example, the sample of Value managers contains all the funds that have a value index (i.e. S&P400 Value, S&P500 Value, S&P600 Value, Russell 1000 Value, Russell 2000 Value and Russell Mid Value) as its designated benchmark. We reported the returns, standard deviations and Sharpe ratio as of these portfolios as the mean returns, standard deviations and Sharpe ratio of the funds across time.			
Conviction Weighted Portfolios: Market Neutral Funds			
Concentrated Portfolios	Conviction Weights Against Own Index		
	Total Returns	Standard Deviation	Sharpe Ratio
Top 5	8.33%	22.17%	0.22
Top 10	6.93%	19.51%	0.18
Top 15	6.18%	18.24%	0.15
Top 20	5.59%	17.29%	0.12
Top 25	5.34%	16.61%	0.11
Top 30	5.14%	16.12%	0.10
All Market Neutral Funds	4.40%	18.03%	0.08
Corresponding Index Ret	3.70%	18.27%	0.04
Conviction Weighted Portfolios: Value Funds			
Concentrated Portfolios	Conviction Weights Against Own Index		
	Total Returns	Standard Deviation	Sharpe Ratio
Top 5	11.20%	18.40%	0.43
Top 10	10.42%	16.83%	0.42
Top 15	9.48%	16.05%	0.38
Top 20	8.84%	15.46%	0.35
Top 25	8.41%	15.12%	0.33
Top 30	7.99%	14.82%	0.31
All Value Funds	8.11%	18.56%	0.27
Corresponding Index Ret	7.04%	19.23%	0.21
Conviction Weighted Portfolios: Growth Funds			
Concentrated Portfolios	Conviction Weights Against Own Index		
	Total Returns	Standard Deviation	Sharpe Ratio
Top 5	14.40%	31.30%	0.35
Top 10	12.86%	28.13%	0.33
Top 15	11.72%	26.14%	0.32
Top 20	10.81%	24.55%	0.30
Top 25	10.21%	23.34%	0.29
Top 30	9.69%	22.47%	0.28
All Growth Funds	6.64%	23.77%	0.15
Corresponding Index Ret	4.83%	22.84%	0.08

We next analysed the performance of the three styles using the Carhart four-factor model and the results are reported in Table 6. Our findings show a clear separation between the risk-adjusted performances of the concentrated portfolios for each of the three investment styles: the growth funds with an annual risk-adjusted return of 7.9%, the value with 4.9%, and the market neutral trailing with

2.8%. The market beta of the growth funds is consistently above one, with that of the market neutral funds ranging both sides of one, and that for the value funds typically being less than one. The preferred stocks by each style of management is strongly tilted towards momentum stocks and each style of manager has a slight tilt towards small cap stocks with this being greatest for the growth managers. Finally true to label, the value funds have a value tilt, the growth funds have a growth tilt, and the market neutral managers have no discernible tilt to either value or growth.

Table 6: Four Factor Model Applied to Different Investment Styles

Table 6 reports the Carhart four-factor model coefficients for the concentrated portfolios for managers of different investment styles. We regress the quarterly returns of the concentrated portfolios against the Carhart four-factor model. The Carhart four-factor model coefficients are reported in the table. Rm-Rf is the coefficient associated with the market premium (market returns less the risk free returns), SMB is the size premium (small stocks minus big stocks), HML is the book-to-market premium (high minus low book-to-market stocks) and momentum is the 11 month less one month momentum factor. We reported the coefficients and the p-values in the table below.										
Conc. Port.	Four Factor Model : Excess Returns based on Weighting against Own Index for Market Neutral Funds									
	Alpha	P-Value	Rm-Rf	P-Value	SMB	P-Value	HML	P-Value	Momentum	P-Value
Top 5	0.686	0.508	1.179	0.146	0.058	0.771	-0.118	0.391	0.368	0.006
Top 10	0.466	0.557	1.103	0.277	0.035	0.822	-0.057	0.588	0.304	0.004
Top 15	0.322	0.629	1.052	0.501	0.023	0.856	-0.021	0.809	0.268	0.002
Top 20	0.268	0.649	1.016	0.817	0.012	0.916	0.006	0.939	0.243	0.002
Top 25	0.218	0.683	0.983	0.789	0.010	0.923	0.027	0.699	0.224	0.002
Top 30	0.184	0.712	0.957	0.462	0.007	0.940	0.041	0.535	0.209	0.002
Conc. Port.	Four Factor Model : Excess Returns based on Weighting against Own Index For Value Funds									
	Alpha	P-Value	Rm-Rf	P-Value	SMB	P-Value	HML	P-Value	Momentum	P-Value
Top 5	1.212	0.172	1.047	0.651	0.093	0.583	0.154	0.193	0.388	0.001
Top 10	0.950	0.170	0.983	0.834	0.075	0.572	0.210	0.025	0.327	0.000
Top 15	0.752	0.210	0.954	0.508	0.075	0.516	0.243	0.004	0.309	0.000
Top 20	0.610	0.261	0.921	0.218	0.076	0.467	0.263	0.001	0.284	0.000
Top 25	0.540	0.281	0.902	0.102	0.065	0.499	0.275	0.000	0.266	0.000
Top 30	0.445	0.342	0.883	0.038	0.065	0.474	0.285	0.000	0.250	0.000
Conc. Port.	Four Factor Model : Excess Returns based on Weighting against Own Index for Growth Funds									
	Alpha	P-Value	Rm-Rf	P-Value	SMB	P-Value	HML	P-Value	Momentum	P-Value
Top 5	1.921	0.223	1.411	0.030	0.251	0.408	-0.465	0.030	0.428	0.032
Top 10	1.519	0.234	1.323	0.036	0.227	0.356	-0.382	0.028	0.370	0.023
Top 15	1.334	0.229	1.264	0.048	0.213	0.320	-0.340	0.025	0.324	0.022
Top 20	1.183	0.227	1.216	0.065	0.196	0.300	-0.300	0.024	0.285	0.022
Top 25	1.057	0.233	1.176	0.095	0.185	0.281	-0.271	0.025	0.259	0.022
Top 30	0.095	0.244	1.143	0.142	0.180	0.258	-0.246	0.027	0.239	0.022

Small versus Large Funds

There is evidence to suggest that large funds as a group underperform small funds because as they grow they experience higher transaction costs (Chen et al., 2005) and they become less aggressive in pursuing performance (Bird et al., 2011). Therefore, comparing what managers might have achieved if they invested in their preferred stocks provides a good opportunity to evaluate whether there is any difference in the stock selection skills of those managing large and small funds. In order to evaluate this we separated the sample into large (top third) and small (bottom third) funds in terms of funds under management with the results of the Carhart four-factor analysis being reported in Table 7. We find that the managers of the larger funds have a slight edge over the managers of the small funds if they restricted themselves to investing in concentrated portfolios composed of their most favoured stocks: the Carhart alpha being 5.6% pa. for the large funds and 4.5% for the small funds. There is little in the way of difference between the risks in the portfolios of the large and small funds with all running large momentum tilts and slight tilts towards growth and small cap stocks. The overall implication we draw from our analysis is that the managers of the larger funds may have superior stock selection skills so evidence of their underperformance suggests for some reason they may be unwilling to fully exploit these superior skills

Table 7: Four factor Model Applied to Small and Large Funds

Table 7 reports the Carhart four-factor model coefficients for the concentrated portfolios for managers of different sizes. We split the funds within our sample into terciles by their average size (as measured by the Tangible Net Assets). We regress the quarterly returns of the concentrated portfolios against the Carhart four-factor model. The Carhart four-factor model coefficients are reported in the table. Rm-Rf is the coefficient associated with the market premium (market returns less the risk free returns), SMB is the size premium (small stocks minus big stocks), HML is the book-to-market premium (high minus low book-to-market stocks) and momentum is the 11 month less one month momentum factor. We reported the coefficients and the p-values in the table below.										
Conc. Port.	Four Factor Model : Excess Returns based on Weighting against Own Index for Small Funds									
	Alpha	P-Value	Rm-Rf	P-Value	SMB	P-Value	HML	P-Value	Momentum	P-Value
Top 5	1.111	0.356	1.235	0.103	0.134	0.564	-0.187	0.245	0.394	0.011
Top 10	0.833	0.368	1.152	0.166	0.110	0.536	-0.120	0.329	0.327	0.006
Top 15	0.689	0.390	1.107	0.258	0.103	0.505	-0.090	0.397	0.292	0.005
Top 20	0.593	0.400	1.068	0.411	0.089	0.513	-0.061	0.517	0.261	0.005
Top 25	0.522	0.413	1.037	0.643	0.082	0.506	-0.039	0.643	0.239	0.004
Top 30	0.452	0.444	1.009	0.895	0.078	0.496	-0.023	0.773	0.222	0.004
Conc. Port.	Four Factor Model : Excess Returns based on Weighting against Own Index For Large Funds									
	Alpha	P-Value	Rm-Rf	P-Value	SMB	P-Value	HML	P-Value	Momentum	P-Value
Top 5	1.361	0.252	1.231	0.103	0.142	0.536	-0.183	0.247	0.403	0.009
Top 10	1.059	0.265	1.155	0.169	0.115	0.529	-0.115	0.363	0.342	0.005
Top 15	0.881	0.278	1.104	0.277	0.103	0.510	-0.077	0.474	0.305	0.004
Top 20	0.766	0.287	1.064	0.446	0.094	0.497	-0.047	0.621	0.277	0.003
Top 25	0.678	0.299	1.032	0.674	0.088	0.485	-0.024	0.777	0.256	0.003
Top 30	0.607	0.316	1.005	0.938	0.084	0.472	-0.008	0.922	0.240	0.003

Institutions versus Retail Funds

The final cut that we make in the data is between institutional and retail funds. The little evidence available on the relative performance of these types of managers is mixed. A very recent study by Del Guercio and Reuter (2011) found that direct-sold retail funds outperformed institutional funds that in turn outperformed broker-sold retail funds. In Tables 8 we report the results of applying a Carhart 4-factor model to fund separated into retail and institutional. We find that the level of outperformance of the concentrated portfolios of the institutional and retail funds to be almost identical ranging from 5.1%pa for the most concentrated portfolio to 2.1%pa for the least concentrated portfolio. Not only are the returns realised almost identical but so are the risks and the portfolio characteristics. The concentrated portfolios run by those managing retail funds and institutional funds have the same strong tilt towards positive momentum stocks and relatively small tilts towards growth stocks and small cap stocks that we have found previously.

Table 8: Four Factor Model Applied to Institutional and Retail Funds

Table 8 reports the Carhart four-factor model coefficients for the concentrated portfolios for managers of both the Institutional and Retail funds. From the sample of active funds, we were able to classify the Institutional funds in our sample through the use of the institutional fund identifier (inst_fund) from CRSP. The remainder of the sample of funds are classified as Retail mutual funds. We reported the coefficients and the p-values in the table below.										
Conc. Port.	Four Factor Model : Excess Returns based on Weighting against Own Index for Institutional Funds									
	Alpha	P-Value	Rm-Rf	P-Value	SMB	P-Value	HML	P-Value	Momentum	P-Value
Top 5	1.256	0.307	1.257	0.080	0.143	0.544	-0.202	0.219	0.404	0.011
Top 10	0.956	0.321	1.174	0.128	0.120	0.518	-0.131	0.306	0.339	0.007
Top 15	0.789	0.337	1.124	0.204	0.108	0.498	-0.092	0.398	0.302	0.005
Top 20	0.681	0.348	1.082	0.339	0.096	0.494	-0.062	0.517	0.271	0.004
Top 25	0.599	0.360	1.048	0.533	0.089	0.482	-0.039	0.653	0.249	0.004
Top 30	0.529	0.382	1.019	0.790	0.086	0.464	-0.022	0.785	0.231	0.004
Conc. Port.	Four Factor Model : Excess Returns based on Weighting against Own Index for Retail Funds									
	Alpha	P-Value	Rm-Rf	P-Value	SMB	P-Value	HML	P-Value	Momentum	P-Value
Top 5	1.232	0.306	1.232	0.106	0.143	0.536	-0.181	0.258	0.406	0.009
Top 10	0.960	0.319	1.156	0.173	0.122	0.511	-0.119	0.352	0.346	0.006
Top 15	0.796	0.340	1.107	0.276	0.116	0.470	-0.085	0.441	0.310	0.004
Top 20	0.683	0.352	1.067	0.436	0.106	0.455	-0.055	0.574	0.281	0.003
Top 25	0.604	0.365	1.036	0.648	0.099	0.444	-0.033	0.709	0.259	0.003
Top 30	0.529	0.390	1.009	0.902	0.094	0.431	-0.017	0.839	0.241	0.003

Implementable Strategy

All the strategies that have been discussed to date have involved an equal investment in each fund in existence at the beginning of each quarter. Although

analysis conducted on this basis is appropriate to address the relative benefits from an investors' perspective of funds running diversified versus concentrated portfolios. However, it certainly does not reflect an implementable strategy because investors will neither invest in hundreds of funds at the same time nor will they rebalance their portfolio of funds on a quarterly basis. In this section, we evaluate a strategy somewhat similar to that which could be pursued by a large investor who puts together either a portfolio of *diversified* funds or a portfolio of *concentrated* funds.

We initially divide the funds into nine groups based on their style (growth, value and style-neutral) and market capitalisation (large cap, medium cap and small cap). A *diversified portfolio of concentrated funds* (Top 5, Top 15, Top 25) is created at the beginning of each quarter by a random choice of one (five) fund(s) from each group with the return for that quarter being the average of the returns realised by the nine concentrated funds. In this way the annual return for each of the years in our sample is determined and so we can calculate the annualised return for this single iteration of the strategy. We repeat this exercise 1,000 times and measure the average return across these 1,000 simulations as being indicative of the return that might be realised from a strategy where an investor follows a strategy where the diversification is done by the investor who distributes his funds across several concentrated funds. The above procedures are repeated where rather than rebalancing the portfolios of managers quarterly, the rebalancing takes place at three years intervals.

In a similar way we build *portfolios of diversified funds* following several different strategies. The first of such strategies is where each quarter (each three years) we just randomly choose a single fund from available at the time. We then calculate the rate of return for each period using the actual returns realised by the chosen funds. We repeat this exercise 1,000 times and measure the average return across these 1,000 simulations as being indicative of the return that might be realised from a strategy where an investor follows a strategy where the diversification is done by the managers. The other four strategies differ in terms of the funds chosen at the time of each rebalancing: (i) three funds randomly chosen; (ii) three funds randomly chosen, one small cap., one medium cap., one large cap.; (iii) three funds randomly chosen, one style neutral, one value, one large growth; (v) nine funds randomly chosen, one of each type. The above procedures are repeated where rather than rebalancing the portfolios of managers quarterly, the rebalancing takes place at three years intervals.

Table 9:

Table 9 reports the results of a strategy based on investing in a diversified portfolio of concentrated funds versus a strategy of investing in a less diversified portfolio of concentrated fund. We initially divide the funds into nine groups based on their style (growth, value and style-neutral) and market capitalisation (large cap, medium cap and small cap). The diversified portfolio of concentrated funds is created at the beginning of each quarter in panel A (and each three years in panel B) by a random choice of one (or five) fund from each group with the return for that year being the average of the returns realised by the nine concentrated funds (45 where five managers are chosen). This strategy is simulated 1,000 times as explained above for the diversified strategy and so an annualised return is determined that is typical of that to be realised from following this strategy. Five separate strategies were simulated following the same procedures outlined above: (i) one manager is randomly chosen each period, (ii) five managers are randomly chosen each period; (iii) three managers are randomly chosen, one small cap, one medium cap, one large cap; (iv) three managers are randomly chosen, one style-neutral, one value, one growth; (v) nine managers are randomly chosen : one from each of the nine groups outlined above. We report the total returns, standard deviation (Std Dev) and the Sharpe Ratio of all of these strategies in the table below.

Panel A: Rebalancing every quarter				
	Concentrated Portfolios	Returns	Std Dev	Sharpe Ratio
1 Fund	<i>Top 5</i>	10.99%	0.29	0.277
	<i>Top15</i>	8.61%	0.23	0.246
	<i>Top 25</i>	7.84%	0.21	0.233
5 Fund	<i>Top 5</i>	10.92%	0.28	0.285
	<i>Top15</i>	8.74%	0.23	0.252
	<i>Top 25</i>	7.90%	0.20	0.248
Any 1 Fund		6.39%	0.20	0.171
Any 5 Fund		6.28%	0.20	0.166
One Of each Cap Fund		7.13%	0.21	0.203
One Of Each Style Fund		6.26%	0.19	0.171
One Of Each Type of Fund		7.15%	0.20	0.212
Panel B: Rebalancing every three years				
	Concentrated Portfolios	Returns	Std Dev	Sharpe Ratio
1 Fund	<i>Top 5</i>	11.07%	0.28	0.294
	<i>Top15</i>	8.86%	0.22	0.264
	<i>Top 25</i>	7.85%	0.20	0.244
5 Fund	<i>Top 5</i>	11.07%	0.28	0.295
	<i>Top15</i>	8.77%	0.22	0.261
	<i>Top 25</i>	7.83%	0.20	0.244
Any 1 Fund		6.17%	0.20	0.161
Any 5 Fund		6.28%	0.20	0.166
One Of each Cap Fundr		7.29%	0.21	0.212
One Of Each Style Fund		6.28%	0.19	0.173
One Of Each Type of Fund		7.07%	0.20	0.206

In Table 9 we report the annualised return, standard deviation and Sharpe ratio for the six strategies where the investors do the diversification and five strategies where the funds do the diversification¹⁷. One thing to note is the performance of the strategies where the investor does the diversification remain unchanged whether nine or 45 funds are chosen or where rebalancing is undertaken quarterly or every three years. It is also worth noting that three of the five ways of building portfolios of diversified funds yield similar results with the other two (one of each cap fund and one of each type of manager) differing because they over-represent small cap funds that outperformed other funds over our data period. It is because of this that we will in future discussion concentrate more on the strategies where with one or five managers are randomly chosen each period in our future discussion.

The main finding to observe is that the returns from a strategy of building a diversified portfolio of concentrated funds consistently outperforms a strategy of building an undiversified portfolio of diversified funds. For example, choosing randomly choosing one manager of from each of the nine groups each three years and investing in each fund's Top 5 portfolio realises a return of 11.07%pa whereas a strategy of randomly choosing one manager every three years and investing in that fund's concentrated (actual) portfolio is 6.17%pa. The outperformance of almost 5%pa of the former strategy does come at the cost of higher risk (a standard deviation of 0.28 versus 0.20) but it does yield a much higher Sharpe ratio (0.29 versus 0.16). Again the former strategy is after transactions costs while the latter is before transaction costs. Once one accounts for this difference, the difference in returns the Top 5 portfolio and the diversified portfolios is reduced to about 4%pa with the Shape ratio for the concentrated strategy still being 50% higher than that for the diversified strategy. The Sharpe ratio of the Top 15 and Top 25 portfolio remains at about 15% after accounting for transaction costs.

¹⁷ There are several reasons why these results will differ from those reported in Table 2. Two important ones being that (i) the weighting to the different investments styles when preparing the Table 2 findings are dependent on the number of each type of manager in our sample whereas the styles are equally weighted when calculating the results in Table 12, and (ii) the managers included in the concentrated portfolios are rebalanced quarterly when preparing table 2 but only annually when preparing Table 12.

Section 4: Summary Conclusion

There are two important steps in the investment process: ranking the stocks in your investment universe (stock selection) and then combining them to form an investment portfolio (portfolio construction). The realised return on the portfolio obviously reflects the joint impact on these two decisions. We have attempted in this study to separate the impact of these two steps by calculating the returns that a manager would have realised if he had restricted his investments to a very concentrated portfolio composed of the stocks that he preferred most. We found a large sample of US mutual funds that the managers would have improved their performance and comfortably outperformed their benchmark if they had gone the concentrated portfolio route.

This finding is not surprising as diversification/risk control is a very important element in the portfolio construction phase. When deciding what weight (if any) to allocate a security in a portfolio, here is a trade-off between its expected return and the impact that that it will have on portfolio risk. It should come as no surprise that this can result in some securities being allocated relatively low (high) portfolio weights even though the manager has strong liking (dislike) for the securities. Hence, it is quite possible for a manager to be quite good at stock selection but for this to not be reflected in fund performance.

The question then is what implication can we draw from our findings? The first is that then much maligned managers of US equity mutual funds who have consistently been found to detract from the wealth of their clients would seem to be fairly competent with stock selection. If managers are able to add value due to their stock selection skills, then this implies that they must be able to identify mispriced stocks which have the further implication that US equities are not efficiently priced. The third major implication of our findings is the suggestion that there may be better ways for investors to achieve diversification rather than requiring it to be done for them by their fund managers.

The remaining question is just who is the winner of our contest. Our evidence is quite clear that the average concentrator realises superior returns than the average diversified portfolio. On the basis of these findings we are willing to award the concentrators a narrow points' victory. One caveat being that a good diversifier will always beat a bad concentrator and that success for the investors will always come back to identifying the managers skilled at stock selection. A second caveat relates to our finding that concentrated portfolios have a large tilt towards positive momentum stocks and smaller tilts towards young, growth stocks. An important consequence of this is that the concentrated portfolios are geared to performing well when market sentiment is positive but equally that they will underperform. Paradoxically, this highlights the need for diversification and so the need for the investor to carefully construct their portfolio of concentrated funds.

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