Concentrated Portfolios: why Less is More

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"As time goes on, I get more and more convinced that the right method in investment is to put fairly 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 that one limits one's risk by spreading too much between enterprises about which one knows little and has no reason for special confidence"

John Maynard Keynes[i]
August 15, 1934

The case for concentrated portfolios

Investing is no more than the sensible allocation of capital. Good capital allocation is simply allocating capital to the most attractive opportunities. To maximise returns over time investors should:

1. find opportunities where they have an analytical edge and where the investment is highly likely to generate superior returns over time; and
2. allocate a material amount of capital into such opportunities.

We believe that fund managers that have concentrated investment portfolios which are weighted into superior investment opportunities (ie where they have an analytical edge) are significantly more likely to outperform over time. We therefore believe that concentrated portfolios are intuitively appealing. Great investors are not only able to identify superior investment opportunities they also take maximum advantage by allocating a material amount of capital to such opportunities.

In 1994, Warren Buffett stated "*if you are a know-something investor, able to understand business economics and to find five to ten sensibly-priced companies that possess important long-term competitive advantages, conventional diversification makes no sense for you. It is apt simply to hurt your results and increase your risk*.[ii]

Whilst the vast majority of fund managers spend significant analytical effort and research resources trying to find superior investment opportunities, their deployment of capital is often sub-optimal as our experience suggests they tend to allocate too little capital to the opportunities where they really have an analytical edge. By and large, most diversify their investments so significantly that the probability of materially outperforming the market is low.

In our view the primary driver behind over diversification is that most investment managers aim to maintain a relatively tight tracking error. If they maintain a tight tracking error and underperform, they are likely to retain their mandate.

Statistical Evidence – Concentrated Investing Works

Whilst most active managers do little to distinguish themselves, there have been a number of funds that have generated significant value add that adopt focused (or concentrated) investment strategies. There is of course the obvious example of Berkshire Hathaway's tremendous track record who, at last report date, held 18 stocks in their common stock portfolio with an allocation of over 60% in their top 10[iii]. Other examples are below:

Table 1: Performance of Concentrated Managers[iv]

	Fund Inception	No of stocks*	% Top 10*	Fund return since inception (% p.a.)[i]	S&P 500 (% p.a.)
Sequoia	15/07/1970	22	77.2%	15.6%	11.8%
Clipper	29/02/1984	20	73.0%	14.5%	13.0%
Oakmark Select[ii]	11/01/1996	20	62.0%	18.0%	N/A
Legg Mason Growth Trust	17/04/1995	25	54.4%	11.6%	11.1%
Longleaf Partners Funds	8/04/1987	23	53.2%	14.2%	10.6%
Weitz Value[ii]	9/05/1986	33	49.7%	13.3%	N/A
Legg Mason Value Trust	16/04/1982	41	45.0%	15.9%	13.7%
Tweedy Brown Value	8/12/1983	41	44.0%	10.9%	11.0%
Third Avenue Value Fund[ii]	1/11/1990	100+	37.5%	16.6%	N/A

i All performance data is as at 30/06/2006 other than Sequoia and Longleaf Partners (31/03/2007) and Third Avenue Value (31/07/2007). Performance data retrieved via individual manager websites.

ii Benchmark performance since inception for Oakmark Select, Weitz Value and Third Avenue Value was not provided by the manager

We acknowledge that this list would probably not be deemed statistically significant, however we stress this is driven not by sampling bias, but rather a limited number of focused fund managers. Concentrated global managers with a significant track record (greater than 10 years) are virtually non-existent.

To support the thesis that concentrated investing is preferable to a more diversified approach we draw upon the Hagstrom/Lamm-Tennant Study[v]. Robert Hagstrom & Joan Lamm-Tennant randomly assembled 1,200 listed companies in the US that had measurable data into 12,000 portfolios of various sizes:

- 3,000 portfolios containing 250 stocks
- 3,000 portfolios containing 100 stocks
- 3,000 portfolios containing 50 stocks
- 3,000 portfolios containing 15 stocks

The performance of these portfolios was then compared to the performance of the S&P 500 for a 10 year period (1987 – 1996). All four portfolio types underperformed the benchmark, with a mean return of 13.8% while the S&P 500 returned 15.2%. The rationale for underperformance is reasonably simple, the portfolios

were equally weighted whilst the S&P was capitalisation weighted during a period in which large cap stocks did relatively well. Looking inside the returns of each portfolio subset, the conclusions of the study become much more interesting:

Table 2: Randomly Selected Portfolio Return Dispersion

No of stocks	Best return (% p.a.)	Worst return (% p.a.)
15	26.6	4.4
50	19.1	8.6
100	18.3	10.0
250	16.0	11.4

The simple conclusion from the above is that your returns are much more likely to be significantly different from the market with a concentrated portfolio.

More important, however, is how the individual random portfolios performed in during this period.

Table 3: Outperformance Results of Randomly Selected Portfolios

No of stocks	Number of portfolios that outperformed	Probability of outperforming the market
15	808	26.93%
50	549	18.30%
100	337	11.23%
250	63	2.10%

The probability of outperforming the market is significantly higher when holding a concentrated portfolio. Note that this relationship only holds when the benchmark return is greater than the median stock return. However, concentrated portfolios offer higher return potential than broadly diversified portfolios.

Given the above, the potential for outperformance is clearly higher with concentrated portfolios than with broadly diversified portfolios. That is to say, that given the same level of (positive) skill, a concentrated portfolio will outperform a broader mandate. If a manager is prone to underperformance, the underperformance is likely to be magnified in a concentrated portfolio.

Additional studies support the argument that concentrated funds perform better than their more diversified counterparts. Kacperczyk et al[vi] found that “more concentrated funds perform better after adjusting for risk and style differences” and Brands et al[vii] found a “positive and significant relationship between performance and portfolio concentration”.

Investing When the Odds are in your favour: The Kelly Formula[viii]

One of the challenges investors have is deciding on not only where to invest, but what portion of their portfolio should be weighted towards underlying investments.
Fortunately, in 1957, John Kelly Jr came up with an answer, known as the Kelly formula, Kelly Optimisation Model, or simply the optimal growth strategy.

The Kelly formula[ix] states the following:

Expected Return/Payoff when you win = Fraction of your bankroll that should be invested and subsequently reinvested.

To give a simple example, take the odds of a blackjack player. Clearly the casino has an edge so typically to maximise return, a stake of zero should be bet, as the edge is zero. However suppose you were an expert card counter and were able to change the odds to you favour, so you calculated a 55% chance of winning. The Kelly Formula states:

Expected return = (0.45 x -1) + (0.55 x 1) = $0.10

Payoff when you win = $1.00

Fraction of bank roll to bet = $0.10/$1.00 = 10%

The above example suggests that where a blackjack player has developed an edge so the chance of winning is 55% the optimal bet is 10% of their bankroll to maximise their return. Of course it is not simple as the edge will increase as there are less cards in the deck and the bet should increase as the edge increases.

Now let's turn out thoughts to applying the Kelly formula to the stock market.

Clearly, the Kelly formula suggests that when you have an edge you should deploy significant amounts of capital to that opportunity to maximise wealth accumulation over time. Whilst the stock market is significantly more complex than the simple examples above the notion of investing 1-2% of your portfolio into opportunities with significant positive payoffs severely constrains wealth accumulation. Unfortunately for investors, this is exactly what many investment managers are inclined to do in a global equities portfolio.

It is also important to recognise that investing too much of your capital into opportunities where you really do not have an edge is likely to lead to suboptimal returns. Therefore knowing when you have an analytical edge and knowing how much capital to allocate is critical to optimising long term investment returns.

"The wise ones bet heavily when the world offers them that opportunity. They bet big when they have the odds. And the rest of the time, they don't. It's just that simple."
Charlie Munger[x]

How many stocks are required to achieve adequate diversification?

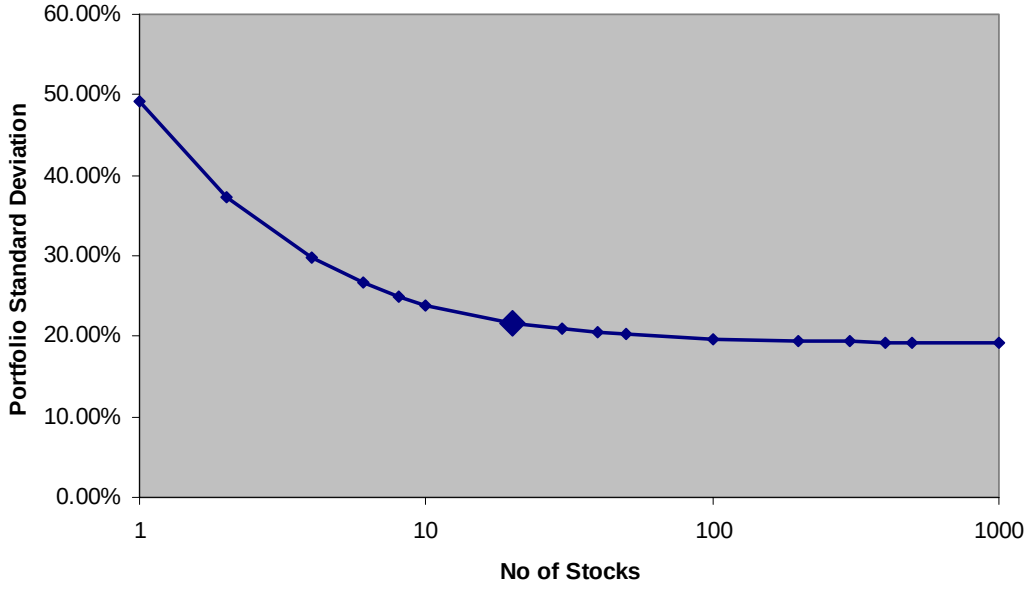
Academics from economics and finance disciplines the world over are generally in agreement about diversification – to maximise risk adjusted returns - an investor should own *many different asset classes*, and within those *many different stocks.*

The validity of multiple asset class investing is well researched and well accepted as a means of improving risk adjusted return. The definition of *many stocks* however, has two distinct schools; traditional academia (Modern Portfolio Theory being the primary example) suggests owning as many stocks as possible as the markets are perfectly efficient, thus the investor should own hundreds of stocks to diversify away all idiosyncratic (or undiversifiable) risk because the market is assumed to be perfectly efficient. However, Warren Buffett is often quoted as saying "*traditional wisdom is often long on tradition and short on wisdom*" and that while efficient market theorists "*observ[ed] correctly that the market was frequently efficient, they went on to conclude incorrectly that it was always efficient. The difference between these propositions is night and day*".[xi]

Benjamin Graham, in his classic text *The Intelligent Investor* suggested that for the defensive investor: "*There should be adequate though not excessive diversification*. This might mean a minimum of ten different issues and a maximum of about thirty"[xii]. Peter L Bernstein concurs with Graham's view, suggesting that one-third of stock returns can be attributed to movements in the market (or index), whilst the other two-thirds are approximately evenly split between industry influences and individual stock characteristics. Bernstein states that as the number of underlying securities increase, "the *power of diversification obliterates the individual attributes of the stocks*" [xiii].

Numerous studies point to declining marginal benefits of diversification as stocks get added to portfolios. Initially, as investments are added to portfolios (presuming they are not highly correlated to existing holdings), they should reduce overall risk, however marginal risk reduction declines markedly as further securities are added to the portfolio. The following chart shows the results of Monte Carlo simulation of randomly selecting portfolios of between 1 and 1,000 stocks in the Russell 1000 in the United States.

Graph 1: Incremental portfolio risk reduction



Source: Statman, J (1987) "How many stocks in a Diversified Portfolio" *Journal of Financial and Quantitative Analysis*

Depending on your personal risk preferences, you can draw you own conclusions about how diversified you should be, but this certainly shows that for the majority of investors, the incremental risk reduction by diversifying a random pool of stocks beyond 15 to 20 (highlighted above) is limited. Whilst risk reduction is more pronounced when allocating stocks on a global basis, the decay pattern is very similar[xiv]. This suggests that both domestically and globally, you can reduce portfolio risk to exhibit risk very close to the index by randomly selecting fifteen to twenty stocks or more.

Importantly, the above analysis considers portfolio risk outcomes from selecting stocks *randomly* and *equally weighting* those stocks. However, active managers do not equally weight stocks or randomly select them. All active managers, in seeking additional returns have a bias towards particular company characteristics, this may be underlying franchise quality, low price/book valuation, or a range of other biases that cause the manager's portfolio to be skewed towards a particular type of company. These underlying biases of active management are designed to improve the investor outcome, however the non-randomness of the portfolio suggests that 15 to 20 stocks selected in this manner will not provide the same diversification benefits as a randomly selected portfolio. Whilst active managers spend significant time understanding underlying business correlation within their portfolios, they are required to select more stocks to provide a similar level of diversification. In light of this, we suggest that an appropriate structured portfolio of 25 - 50 securities will achieve sufficient diversification to ensure the portfolio is not overly correlated to a single company, industry specific or macroeconomic risks. The most important factor in achieving sufficient diversification within a portfolio is assessing how individual investments are correlated with each other.

In the face of this it is peculiar that the median active manager holds over 130 stocks. The difference in portfolio risk from a manager who holds 20 securities is likely to be immaterial, however with such a large number of stocks the ability to generate excess return is significantly reduced.

Peter Lynch[xv] suggested that "in small portfolios I'd be comfortable owning between three and ten stocks" (here Lynch was referring to the portfolios of individual investors). When Peter Lynch left Fidelity with an impeccable track record he was managing $9 billion across 1,400 stocks in the Fidelity Magellan Fund, despite this , Lynch states "Don't own 1,400 stocks if you can help it…that's my problem and not yours"[xvi].

We have established that there is significant academic backing for a concentrated portfolio of equity securities, provided that the investment manager truly has an analytical edge. However portfolio construction within concentrated portfolios is of paramount important to strong long term risk adjusted returns.

Portfolio Construction Considerations & Conclusions

The risk of over-diversifying portfolios is a very real risk for financial planners and intermediaries. With the median global manager holding a portfolio of 134 securities (van Eyk)[xvii], the underlying investor in a three manager portfolio is likely to have indirect holdings of over 350 securities in aggregate (assuming 10% commonality). A portfolio consisting of this many securities (which implies an average stock holding of less than 0.30%), has a low probability of materially outperforming the market.

With this in mind, together with the compelling arguments for portfolio concentration presented above, this paper contends that financial planners and intermediaries constructing multi-manager portfolios are likely to be acting in the best interests of their clients by adopting one of two strategies:

i. Invest in a range of concentrated funds to achieve style neutrality without over-diversifying into hundreds of securities – this will offer the greatest chance of large excess returns, whilst importantly having a low probability of over-diversification
ii. If market exposure is explicitly required, establish separate pools of beta (an index fund or a multi-manager portfolio) and alpha (concentrated funds). This will provide a low cost market exposure platform around which concentrated managers can drive alpha into the overall portfolio

We believe that a policy of portfolio concentration may well decrease risk if it raises, as it should, both the intensity with which an investor thinks about a business and the comfort level he must feel with its economic characteristics before buying into it. In stating this opinion, we define risk, using dictionary terms, as "the possibility of loss or injury"

Warren Buffett[xviii]

[i] Cited in Chairman's Letter, Berkshire Hathaway 1991 Annual Report

[ii] Ibid.

[iii] Berkshire Hathaway 2006 Annual Report, p15.

[iv] This selection of managers was presented by Ashton Z (2007) How Concentrated Should You Be?: Re-Examining the Big Bet Theory. Presentation at Value Investing Conference West, 2007. The concentration statistics were gleaned from this presentation, no dates were provided. The list was reduced to managers that had a track record of greater than ten years.

[v] Hagstrom, R (1999) The Warren Buffett Portfolio pp54-58

[vi] Kacperczyk, M, Sialm, C and Zheng, L (2005) *On the Industry Concentration of Actively Managed Equity Mutual Funds*, Journal of Financial Vol LX, No 4 August 1996, p 1985

[vii] Brands, S, Brown, S.J. and Gallagher, D.R. (2005) *Portfolio Concentration and Investment Manager Performance*, p6.

[viii] The contents of this section are largely drawn from Pabrai, M (2007) The Dhando Investor, pp 71-84

[ix] The mathematics of the Kelly formula are outside the bounds of this paper. For a detailed discussion refer to Kelly, J.L (1956) *A New Interpretation of Information Rate* and Thorp, E (1997) *The Kelly Criterion in Blackjack, Sports Betting and The Stock Market*

[x] Cited in Pabrai op. cit. Kaufman, P.D. (2005) Poor Charlie's Almanack p. 184

[xi] Chairman's Letter, Berkshire Hathaway 1988 Annual Report

[xii] Graham, B (1949) The Intelligent Investor p 65

[xiii] Bernstein, P L (1992) Capital Ideas, p81

[xiv] Malkiel, B.G. (2007) A Random Walk Down Wall Street, p191

[xv] Lynch, P (1989) One Up on Wall Street, p240

[xvi] Ibid, p239.

[xvii] van Eyk Research International Equity Review 2007

[xviii] Chairman's Letter, Berkshire Hathaway 1993 Annual Report