OCTOBER 2020

# Conviction Versus Quantity

## Examining the key drivers of risk, returns and diversification in equity portfolios

> ... if a plot of ground be sown with several distinct genera of grasses, a greater number of plants and a greater weight of dry herbage can thus be raised.
>
> – Charles Darwin, On the Origin of Species

Diversification is an established concept from which several fields – from agriculture to sociology – have benefitted, and finance is chief among them. Modern Portfolio Theory (MPT) has illustrated that combining multiple holdings in a portfolio lowers its risk without necessarily sacrificing its return. Such diversification benefits are evident in equity investment, and over the decades, empirical research has found that investors can actually capture most of the diversification benefits with approximately 30 randomly-selected portfolio holdings.[1]

Nevertheless, there remain fears of being too diversified or too concentrated, and the financial community is still divided about the "ideal" number of stocks to hold in a portfolio to achieve diversification and an optimal risk/reward balance. While we'd agree that investors shouldn't put all their eggs in one basket, we also question whether the debate surrounding the ideal number of stocks is asking the wrong question entirely. More specifically, we posit that while portfolio diversification is key to investing success, the more pertinent factor driving this diversification isn't the quantity of stocks, but rather, a portfolio manager's conviction in the names they hold.

### The law of diminishing marginal returns

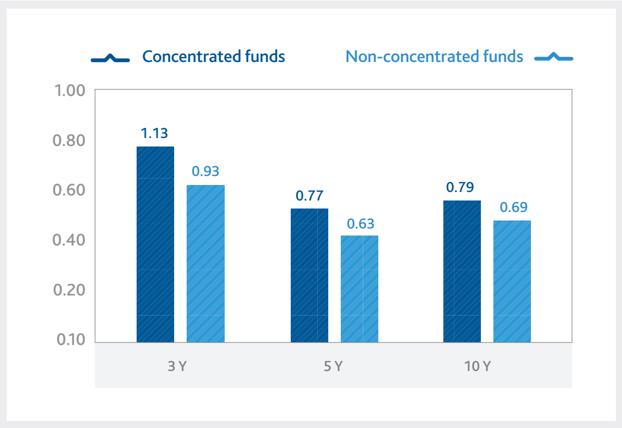
Financial markets are unpredictable, and it's common for investors and portfolio managers to believe that in their equity portfolios, a large number of holdings is crucial to reduce risk. But is this really the case?

1 For example, see Statman, Meir. "How Many Stocks Make a Diversified Portfolio?" The Journal of Financial and Quantitative Analysis, vol. 22, no. 3, 1987, pp. 353–363.

To answer this question, we examined actively-managed, large-cap global equity funds around the world with a track record of at least 10 years, resulting in a sample of 217 funds.[2] Overall, the funds had a median of 73 holdings at the end of 2019, indicating that many still believe more names is better. However, in the following chart, we can see that the Sharpe Ratios of portfolios with a 10-year average of 40 names or less (which we define as "Concentrated") are higher than their "Non-concentrated" peers (i.e. those funds with more than 40 names). In other words, our analysis shows that portfolios with a smaller number of securities appear to have been better-compensated per unit of risk over the past decade.

### Concentrated funds have shown better risk-adjusted returns than Non-concentrated funds

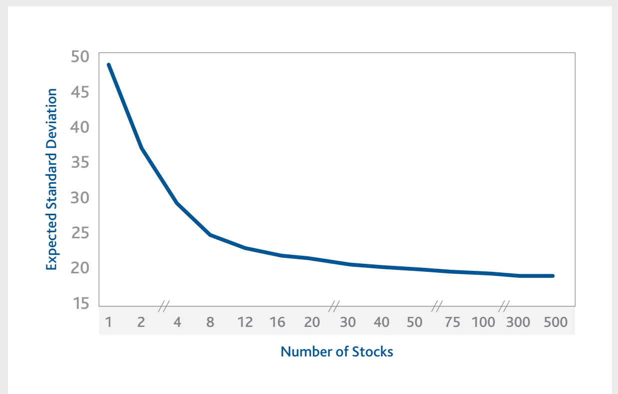
Sharpe ratios




Source: Fiera Capital, via eVestment using our sample of all (217) actively-managed, large-cap global equity funds that had a 10-year track record as of December 31, 2019 and that disclosed their number of holdings. "Concentrated funds" refers to funds with a 10-year average of 40 holdings or less as of December 31, 2019. "Non-concentrated. funds" refers to funds with a 10-year average of more than 40 holdings as of December 31, 2019.

We see a link between these results and the fact that equity diversification exhibits a pattern of diminishing marginal returns; each time an investment is added to an equity portfolio, it may lower the portfolio's unsystematic (i.e. diversifiable) risk – but only up to a certain point. Research has demonstrated that as new holdings are added to a portfolio with a very small number of stocks, the diversification benefits of adding those new holdings are significant. However, as that portfolio grows, the marginal benefit of adding more stocks appears to decrease rapidly. Elton and Gruber, for example, found that when starting from a one-stock portfolio, more than half of that portfolio's risk (in terms of standard deviation) can be eliminated by adding nine more randomly-selected stocks.[3] However, by adding 10 more stocks to form a 20-stock portfolio, the risk (of the original one-stock portfolio) is reduced only by an additional 4.6%. Adding another 10 stocks (to total 30 holdings) reduces risk by 1.7%, and another 10 stocks (to 40 total) by a mere 0.8%. The reduction of risk beyond that level becomes insignificant. Research on this matter has thus supported that the diversification benefits of increasing the number of holdings in an equity portfolio quickly become negligible as the number of holdings rises.

### Diversification effect on portfolio risk




| Number of Stocks in the Portfolio | Expected Annualized Standard Deviation (%) | Marginal Risk Reduction (%) |
|---|---|---|
| 1 | 49.24 | - |
| 10 | 23.93 | 51.40 |
| 20 | 21.68 | 4.57 |
| 30 | 20.87 | 1.65 |
| 40 | 20.46 | 0.83 |
| 50 | 20.20 | 0.53 |
| ... | | |
| 75 | 19.86 | 0.69 |
| 100 | 19.69 | 0.35 |
| ... | | |
| 200 | 19.42 | 0.53 |
| 300 | 19.34 | 0.18 |
| 400 | 19.29 | 0.09 |
| 500 | 19.27 | 0.05 |

Source: Elton, E. J., and Gruber, M. J.. Modern Portfolio Theory and Investment Analysis, 2nd ed. New York: John Wiley & Sons (1984). Note that Elton and Gruber used variances of weekly returns while we converted these to standard deviations of annual returns instead.

2 Source: eVestment, extract made on August 8th, 2020. The sample consists of all (217) actively-managed, large-cap global equity funds that had a 10-year track record as of December 31st, 2019 and that disclosed their number of holdings; of these 217 funds, 56 funds had a 10-year average of 40 names or less, and 161 had a 10-year average of more than 40 names. Results are displayed in USD. The results could be different if a different concentration level was chosen.
3 Elton, E. J., and Gruber, M. J. Modern Portfolio Theory and Investment Analysis, 2nd ed. New York: John Wiley & Sons (1984).

## The drivers of diversification

Up to now, we've seen that from a risk/reward perspective, portfolios with a larger number of stocks are dominated by their counterparts with fewer holdings. However, that doesn't necessarily mean that funds with a smaller number of holdings are "better". In order to determine the portfolio's diversification and downside protection, it's crucial for investors to scrutinize their portfolios and dive deep into their drivers of risk and return. Specifically, we believe there are two elements of portfolio construction that are often overlooked.

### Underlying revenue exposure

Geographical and sector diversification are usually the two first major concerns that come to investors' minds, but one cannot merely look at the stock's trading venue or index provider's classification to determine its true country or sector of risk – doing so doesn't provide a complete picture. For example, it's common for firms to be incorporated and/or listed in one country, but for most of their revenue – and consequently, their risk – to be derived from other regions. Samsung Electronics, for example, is headquartered in South Korea and its stock trades on the Korea Stock Exchange, making it an emerging markets holding.[4] Yet Samsung is one of the world's largest producers of electronic devices and produces about a fifth of South Korea's total exports, generating about 85% of its revenue from outside the country in 2019.[5] It's thus hard to argue that Samsung is a true emerging markets name, and treating it as such could lead to risk/return profiles that don't meet investor expectations.

### Portfolio concentration

For portfolios with a large number of names, it's important in our view that investors not take diversification for granted. One might expect an index with over 500 names such as the S&P 500 to be well-diversified across its many names. But dig deeper into that index, and you see that it's much less diversified than its name would suggest. Since the S&P 500 is weighted based on market capitalization, larger companies have a greater impact on the index's risk and performance. Specifically, the top 10 companies in the S&P 500 count for about 27% of the index's weight and account for more than 30% of its volatility as of July 31st, 2020.[6]

We can see this reduced diversification by examining the S&P 500's Effective Number of Constituents (ENC), a measure that equates the concentration of a fund or index to that of an equally-weighted one, using the commonly-used Herfindahl-Hirschman Index.

Given the recent outperformance of some major companies and multiple mega mergers, the ENC of the S&P 500 stood at just 70 as of July 31, 2020. In other words, this 505-stock, market cap-weighted index is actually more concentrated than ever before and is akin to a 70-stock, equally-weighted portfolio.[7]

The ENC also enables investors to compare the level of conviction from one fund manager to another (and as we'll see in the next section, conviction matters). While 70 is the lowest ENC for the S&P 500 ever, one can hardly label the index, which counts 418 names with a weight of less than 0.25%, as "high-conviction".[8] An ENC of this magnitude for an actively-managed, bottom-up portfolio should raise a red flag regarding the manager's security selection and portfolio construction process and should prompt investors to challenge their portfolio manager on the benefits of holding their smallest positions.

**HERFINDAHL-HIRSCHMAN INDEX (HHI)**

The HHI is a widely-used concentration measure to determine market competitiveness. To aid in determining portfolio concentration, it is calculated as the sum of constituent weightings squared.

$$\mathrm{HHI} = \sum_{i=1}^{n} w_i^2$$

where $w_i$ denotes the weight of stock $i$ in the portfolio, and $n$ represents the number of stocks in the portfolio.

**EFFECTIVE NUMBER OF CONSTITUENTS (ENC)**

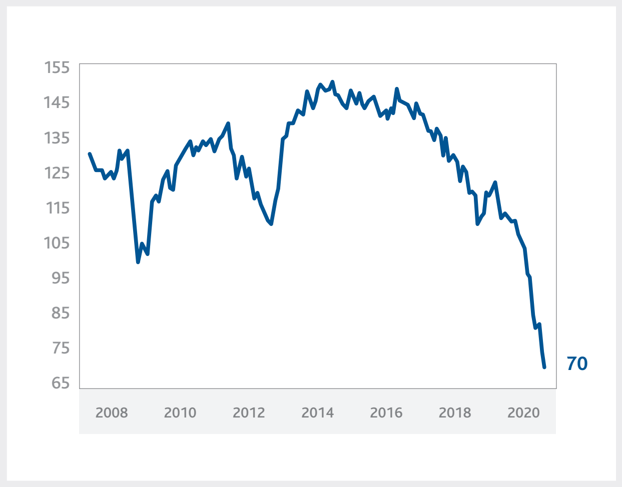
The ENC allows for easier interpretation in the context of portfolio/index concentration. It is calculated as the inverse of the HHI.

$$\mathrm{ENC} = \frac{1}{\mathrm{HHI}}$$

The ENC will vary between 1 and the number of stocks in the portfolio/index; the lower the ENC, the higher the portfolio concentration.

4 As of September 2020, South Korea is considered as an emerging market by MSCI but a developed market by FTSE Russell.
5 Samsung Electronics Co., Ltd. 2019 Business Report.
6 Source: Fiera Capital.
7 Source: Fiera Capital.
8 As of July 31, 2020.

**Effective number of constituents of the S&P 500**




Source: Fiera Capital, as of July 31, 2020.

To be clear, we don't necessarily claim that the S&P 500 is not well-diversified, or that Samsung Electronics is a developed market issuer but we do believe it's critical to remember that appearances can often be deceiving. As such, in order to determine an equity portfolio's true diversification potential, we hold that one must dig deeper than just examining the number of stocks.

## Conviction matters

Despite the fact that some investable universes may contain thousands of companies, investment opportunities with the potential to outperform are not easy to find. Bessembinder notably found – when analyzing the performance of all U.S. stocks in the Center for Research in Security Prices (CRSP) database from 1926 to 2016 – that "most common stocks do not outperform Treasury bills over their lives."[9] He also found "that slightly more than 4% of the firms contained in the CRSP database collectively account for all of the net wealth creation in the US stock market since 1926." In other words, according to his research, the majority of public companies don't offer returns that are commensurate with the risk being taken by investing in a stock. This is one of the main arguments for active versus passive management; i.e., as not all companies in the index are necessarily good investments, by diligently selecting only the best companies that suit their investment criteria, active managers should, theoretically, be able to generate superior performance. Nevertheless, studies have shown that, on average, actively-managed funds do not outperform the market after fees and expenses.[10] While these results can appear somewhat counterintuitive, there may be one missing piece of the puzzle: conviction.

### Portfolio managers' top convictions outperform their lower conviction names

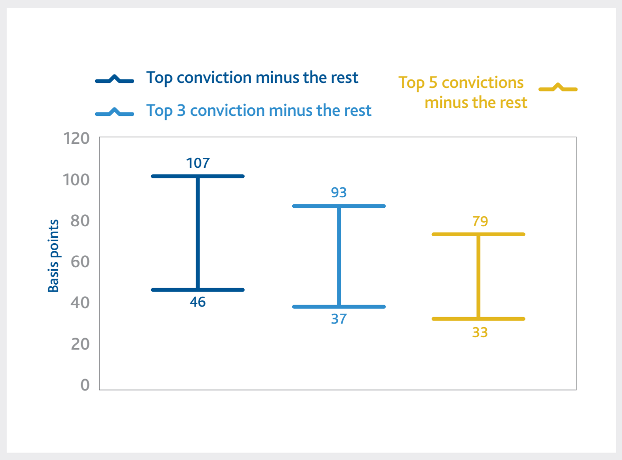
It's common for active managers to be unwilling to invest too heavily in their best ideas for fear of appearing undiversified. As a consequence, as more and more names are added, the portfolio managers' highest conviction names – those that they feel are most likely to outperform – will occupy a smaller place in the portfolio, rendering it diluted. Consequently, if the managers' investment theses on their highest conviction names come to fruition and these holdings outperform, overall portfolio returns won't be as high as they would have been had these high-conviction names occupied a larger position (i.e., if the portfolio manager had not added some of their smaller, lower conviction names to the portfolio).

Of course, this is only a concern if those portfolio managers' highest conviction names generate higher returns than the other stocks in the portfolio. On this matter, Cohen, Polk, and Silli examined the performance from January 1991 to December 2005 of U.S. domestic equity funds that disclosed holdings, and then ranked each fund's holdings by conviction (what they called "best ideas") every quarter based on four different measures.[11] Once ranked, they compared the performance of each fund's top convictions against the other lower-conviction names within the fund. Their results showed an average monthly outperformance of between 46 and 107 basis points for the portfolio manager's highest-conviction names versus the rest of the portfolio; for the top 3 convictions, between 37 and 93 basis points; and for the top 5, between 33 and 79 basis points. Thus, the above study offers evidence that high conviction in one's holdings is beneficial to driving superior returns.

**9** Bessembinder, Hendrik. 2018. "Do Stock Outperform Treasury Bills?" Journal of Finance Economics. Volume 129, Issue 3, September 2018, Pages 440-45.
**10** For example, see Wermers, Russ. 2000. "Mutual Fund Performance: An Empirical Decomposition into Stock-Picking Talent, Style, Transactions Costs, and Expenses." Journal of Finance.
**11** Cohen, Randolph B. and Polk, Christopher and Silli, Bernhard, Best Ideas (March 15, 2010).

### High conviction names have outperformed lower conviction ones

Average monthly outperformance of high vs low conviction names



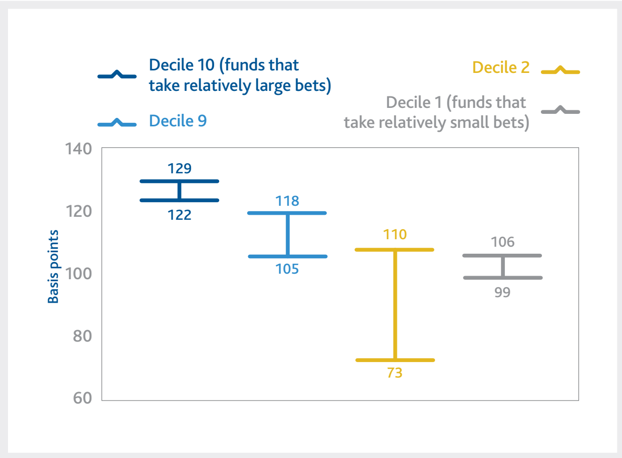

Source: Cohen, Randolph B. and Polk, Christopher and Silli, Bernhard, Best Ideas (March 15, 2010).

## Concentrated funds have outperformed, including during down markets

Because the performance of a manager's best ideas is generally higher than those of lower-conviction names, one would expect more concentrated funds (i.e., those with fewer names and a larger weight towards top holdings) to outperform – and that's exactly the case, as research shows that concentrated funds indeed tend to beat less concentrated funds. Busse, Green, and Baks examined all U.S. domestic equity funds that disclosed holdings and, each quarter, sorted them into deciles using four different measures to identify the degree to which each fund's manager takes relatively large bets (including the use of the Herfindahl-Hirschman Index).[12] The 10th decile represents funds whose managers take the biggest bets while the 1st decile represents those funds with the relatively smallest bets. They found that more concentrated funds – the ones that take relatively large bets – outperformed their more broadly-diversified counterparts by approximately 30 basis points per month, or roughly 4% annualized. For example, while funds in the top decile of concentration generated returns of between 1.22% and 1.29% per month, lowest decile (i.e. least concentrated) funds returned only between 0.99% and 1.06%. They also conclude that "a portfolio consisting of the holdings of concentrated, big-bet managers would outperform a highly diversified portfolio of a single manager." In other words, investors seeking to broaden their equity exposure would theoretically see higher returns by investing in a combination of concentrated portfolios rather than in a single fund with a large number of holdings.

### More concentrated funds versus non-concentrated

Average monthly returns




Source: Busse, Jeffrey A. and Green, T. Clifton and Baks, Klaas, Fund Managers Who Take Big Bets: Skilled or Overconfident. AFA 2007 Chicago Meetings Paper.

The findings of the aforementioned research conform with the results of our earlier sample of actively-managed, large-cap global equity funds; the "Concentrated" funds significantly outperformed their "Non-concentrated" peers over multiple timeframes. Moreover, the Non-concentrated funds' value added is very small; 13 basis points over a 10-year period for Non-concentrated funds versus 172 basis points for Concentrated funds, suggesting that some investors may be paying for active management that has, in fact, limited alpha-generation potential.

**12** Busse, Jeffrey A. and Green, T. Clifton and Baks, Klaas, Fund Managers Who Take Big Bets: Skilled or Overconfident. AFA 2007 Chicago Meetings Paper.

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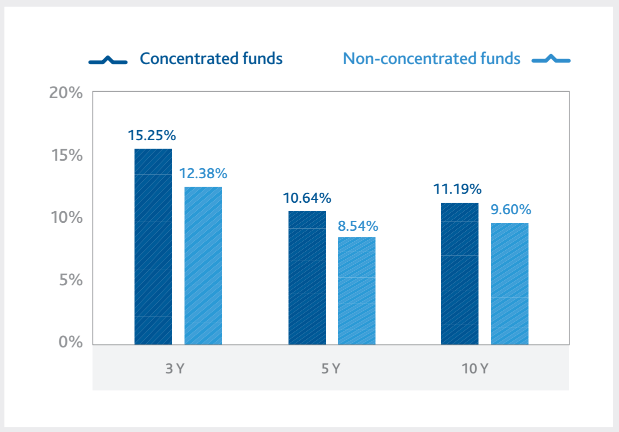
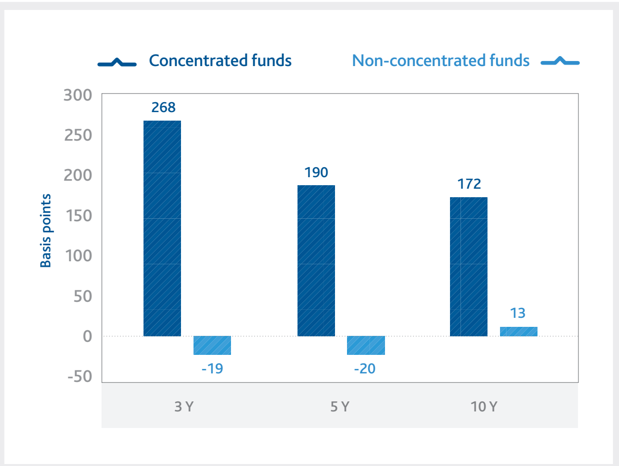
### Concentrated funds have outperformed Non-concentrated funds and benchmarks over multiple time periods

Annualized total returns




### Value added vs the MSCI World Index




Source: Fiera Capital, via eVestment using our sample of all (217) actively-managed, large-cap global equity funds that had a 10-year track record as of December 31, 2019 and that disclosed their number of holdings. "Concentrated funds" refers to funds with a 10-year average of 40 holdings or less as of December 31, 2019. "Non-concentrated funds" refers to funds with a 10-year average of more than 40 holdings as of December 31, 2019. MSCI World Index, data in USD via bloomberg.

Finally, despite Concentrated funds' outperformance over their Non-concentrated peers over time, it's crucial to consider how these funds perform through down markets; after all, downside protection is diversification's primary purpose, as it helps prevent the drawdowns which can be so detrimental to long-term portfolio performance. It would thus be prudent to analyze Concentrated funds' performance specifically during down markets. Looking at calendar-year gross returns, we can see that our defined Concentrated funds still significantly beat both the MSCI World and Non-concentrated funds during the market's four down years over the last 12 (as well as the recent bear market in early 2020), indicating that they offer some protection from drawdowns.

### Value added vs the MSCI World Index

In down markets

| | Total returns *MSCI World Index (%)* | Value added *Concentrated funds (bps)* | Value added *Non-concentrated funds (bps)* |
|---|---|---|---|
| Q1 2020 | -20.94 | 242 | -73 |
| 2019 | 27.67 | 106 | -122 |
| 2018 | -8.71 | 122 | -101 |
| 2017 | 22.40 | 658 | 209 |
| 2016 | 7.51 | -112 | -66 |
| 2015 | -0.87 | 314 | 40 |
| 2014 | 4.94 | -21 | -6 |
| 2013 | 26.68 | 133 | -42 |
| 2012 | 15.83 | 237 | 106 |
| 2011 | -5.54 | 238 | 53 |
| 2010 | 11.76 | 255 | 168 |
| 2009 | 29.99 | 939 | 298 |
| 2008 | -40.71 | 443 | 121 |

Source: Fiera Capital, via eVestment using our sample of all (217) actively-managed, large-cap global equity funds that had a 10-year track record as of December 31, 2019 and that disclosed their number of holdings. Exceptionnaly for 2008, the sample consisted of 169 funds. "Concentrated funds" refers to funds with a 10-year average of 40 holdings or less as of December 31, 2019. "Non-concentrated funds" refers to funds with a 10-year average of more than 40 holdings as of December 31, 2019. MSCI World Index, data in USD via bloomberg.

## Conviction over quantity

The popular belief is that an equity portfolio with a larger number of holdings is in general better diversified, less volatile and provides better downside protection. However, research has shown that the law of diminishing marginal returns is all too real, and that at a certain point additional holdings do not materially lower risk – in fact, they likely dilute managers' top convictions and limit potential alpha generation.

True portfolio diversification doesn't happen simply as a result of adding more names into a portfolio, and concentrated portfolios can offer just as much diversification as more broadly-invested funds. Moreover, outperformance isn't solely a function of the number of holdings in the portfolio and, as shown in this paper, conviction is an important driver of returns. Given this, we believe that investors should challenge their investment teams, especially on the benefits of holding their smallest positions. Do the portfolio managers still have high conviction towards their 40th, 50th, and 60th names? Are their investment theses strong enough to justify the dilution of their top convictions? These are the types of questions investors should be asking their portfolio managers to ensure that, through good times and bad, their investments will continue to thrive.

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