NORTHERN TRUST
ASSET MANAGEMENT

HIDDEN RISK OF EQUAL WEIGHTING

"Despite providing diversification to the cap-weighted index, equal weighting comes with significant risks; investors would be better served intentionally targeting known and compensated sources of return, while closely managing risk."

Quantitative Strategies

Jim Johnson, CFA
Senior Quantitative Strategist

Jordan Dekhayser, CFA
Head of Quantitative Strategists

Equal Weighting: The (Limited) Benefits and the (Substantial) Risks

The significant outperformance or underperformance of groups of stocks, such as sectors, styles or capitalization ranges, can create extreme levels of concentration in cap-weighted indices. As of the end of 2020 for example, the S&P 500 index contains substantial exposure to expensive growth stocks that, as a group, are trading at or near record multiples by some measures. The challenge for those passively invested in cap-weighted indices is that these lofty expectations are embedded in prices. Given this backdrop, it is not surprising that many investors are looking to diversify their portfolios both for future return and risk management. The question we now turn to is whether an equal-weighted index is a sensible solution to these challenges.

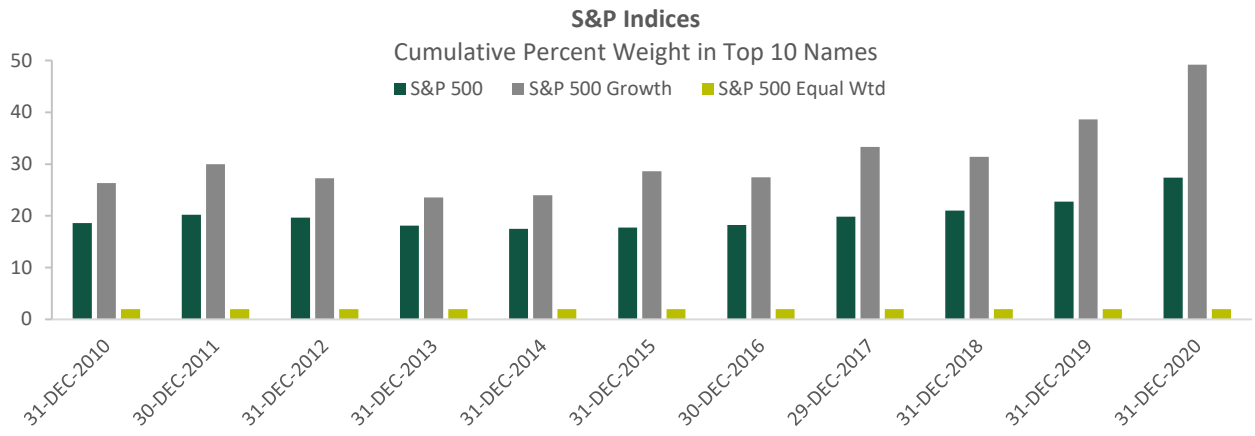
Admittedly, equal weighting does provide some benefits relative to the cap-weighted alternative. For example, equal weighting provides more diversification, a value-orientation (although not always), and a small-cap bias, all features that may be welcomed. However, even these benefits can be quite unstable over time, as we will show shortly. Further, these "fixes" come with several unintended consequences, including higher volatility, significant active sector exposures, negative momentum, as well as higher turnover from the smaller and less liquid part of the large cap universe. We think a complete review of the costs as well as the benefits is essential before deciding to invest in an equal weighted manner.

An Overview of Equal Weighting

Like any index-based approach, equal weighted indices come with their own rules and methodological choices that can have meaningful impacts on outcomes. Two of the more prominent domestic equal weighted indices are from S&P Dow Jones (S&P) and FTSE-Russell (Russell). Our analysis focuses on the S&P approach, which equal weights at the stock level, with exceptions for companies that have multiple asset classes in the index. The Russell approach equally weights each sector within the index and then equally weights the companies within each sector. This difference in approach has created realized active risk against S&P's equal weighted version of over 3% per year over the past 20 years. Thus, not all equal weighted indices are created, well, equally.

As we noted earlier, heightened concentration is one reason why more investors are looking to alternatives such as equal weighting. **Exhibit 1** displays the total weight of the largest 10 names in the S&P 500, S&P 500 Growth, and S&P 500 Equal Weighted indices over time. Of course, the weight of the top 10 names in the S&P 500 Equal Weighted index remains constant at around 2%. However, the weight of the top 10 names in the S&P 500 has grown significantly since 2010, with the increase in concentration coming entirely from the Growth index. Further, this has led to a cap-weighted index whose sector profile has evolved significantly over time, meaning, among other things, that equal weighting will take significant active sector bets that lack any investment intuition. For example, as of 12/31/2020, Information Technology comprised 27.6% of the S&P 500 but only 14.7% of the S&P 500 Equal Weighted.

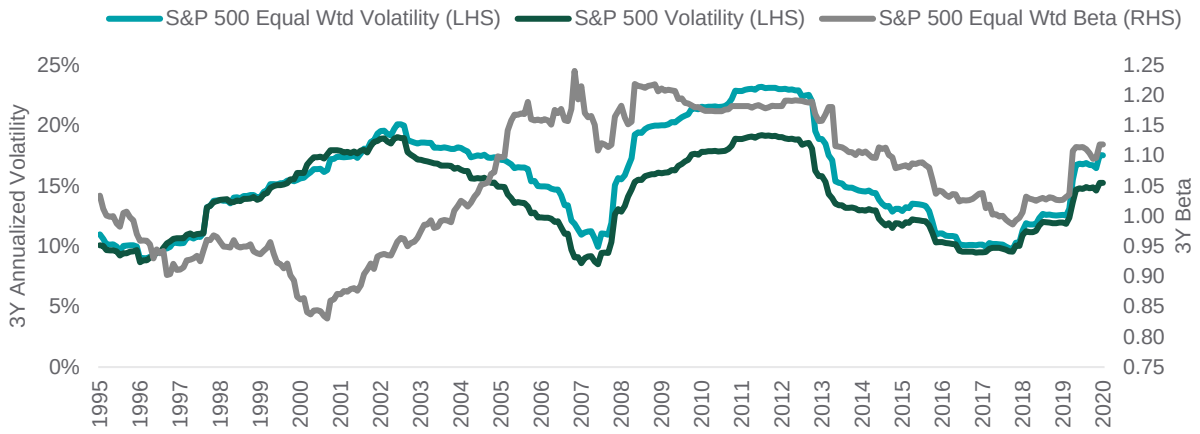
EXHIBIT 1: WEIGHT IN TOP 10 HOLDINGS



Sources: Northern Trust, S&P Dow Jones. From 12/31/2010 through 12/31/2020. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index.

However, although the S&P 500 Equal Weighted index clearly reduces concentration risk, a look at realized volatility actually points to an increase in risk overall – both in terms of standard deviation and beta. Over the past 30 years, the average realized annualized volatility of the S&P 500 is 14.6%, compared to 16.2% percent for the S&P 500 Equal Weighted. Further, the realized beta of the S&P 500 Equal Weighted against the S&P 500 over this time frame is 1.06. This high volatility, high beta posture is at odds with research showing that beta risk and excess volatility are negatively compensated over time. **Exhibit 2** displays the volatility and beta of the S&P 500 Equal Weighted against the S&P 500 over time.

EXHIBIT 2: ROLLING 3-YEAR VOLATILITY AND BETA FOR S&P 500 EQUAL WEIGHT AND S&P 500



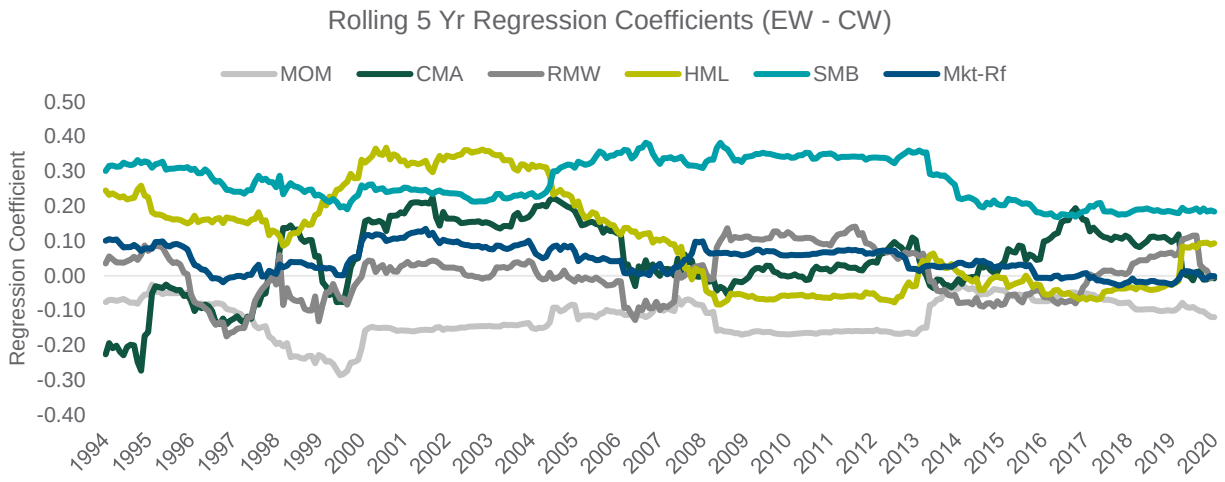
Source: Northern Trust, S&P Dow Jones. From 12/31/1992 – 12/31/2020. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index.

Unstable Factor Exposures

Another way to look at the differences between the equal and cap weighted indices is through a factor lens. Research demonstrates that factors are the dominant driver of excess return in the marketplace (see, for instance, Carhart [1997] and Choi, et al [2020]). Therefore, it is crucial to understand how this impacts an equal weighted approach. When thinking about the construction and mechanics of the S&P 500 Equal Weighted index, some of the factor exposures are fairly intuitive. We would expect equal weighting to favor relatively smaller companies as well as negative momentum, due to the rebalancing mechanism that will sell recent relative winners to buy recent relative losers. To evaluate this intuition, and also look at other factor exposures, we regressed the active returns of the S&P 500 Equal Weighted relative to the S&P 500 on the Fama-French 5 Factor Model plus momentum. The results shown in **Exhibit 3** are the coefficients of rolling 5 year regressions.

As our intuition predicted, there is indeed a positive loading to small size (SMB) and a negative loading to momentum (MOM), both of which are consistent. We also see a positive loading to beta (Mkt-Rf) which is consistent with what we saw in **Exhibit 2**. Looking at quality, the regressions reveal positive loadings on average for factors related to quality, including asset growth (CMA) and gross profitability (RMW). However, the coefficients are quite unstable with recent observations being fairly neutral. Value (HML) follows a similar pattern to the quality factors, although the coefficient is modestly more positive in recent dates. Keeping in mind these results are returns based, we also looked at holdings-based measures using third party risk model data in results not shown, and see largely the same results – small size, negative momentum, high beta, and otherwise unstable exposures.

EXHIBIT 3: ROLLING 5-YEAR FAMA-FRENCH 5 FACTOR PLUS MOMENTUM REGRESSIONS



Source: Northern Trust, Ken French Data Library. From 12/31/1989 – 12/31/2020. EW is equal weighted, and CW is cap-weighted.

Other Considerations

In addition to increased and unbalanced levels of risk, equal weighting brings an explicit incremental cost due to its higher turnover. Each quarter, the index undergoes a rebalance, where each stock's weight is brought back to an equal weight position. As a result, the level of performance drift or dispersion amongst stocks will lead to an increase in trading, and therefore increased costs. Over the past 10 years, the annualized turnover of the S&P 500 Equal Weighted was about 28%, compared to about 5% for the S&P 500, leading to an unavoidable increase in transaction costs, and potentially other challenges for taxable investors.

What Can Investors Do?

Given the outsized drawbacks we have highlighted to equal weighting, we suggest that investors consider a more deliberate approach to reducing concentration risk that can more precisely and consistently target exposures to compensated risks while mitigating exposures to uncompensated risks. Although a specific portfolio recommendation is beyond the scope of this paper, we suggest here that an efficiently constructed, actively managed strategy that targets compensated sources of risk and intentionally controls for uncompensated sources of risk has significantly more benefits than an equal weighted index, but without the many drawbacks discussed herein.

For example, investors can aim to keep the portfolio's beta and overall volatility levels within a tighter range relative to the index without sacrificing other desirable characteristics. Further, more pronounced exposure to smaller stocks in the S&P 500, as can be found in the S&P 500 Equal Weighted, can be a good source of risk over time, but must be kept at a level consistent with expected risk and return, unlike the unstable exposure to size and other factors that the S&P 500 Equal Weighted provides.

Also consider that other compensated sources of risk, such as momentum, low beta, and quality, are either flipped, or highly unstable in the equal-weighted approach looking at regression results. An efficiently managed active approach can target positive exposures, while keeping other sources of uncompensated risk low overall. Other desirable risk exposures such as value can also be targeted intentionally at appropriate levels while tightly controlling undesirable risk exposures such as "wrong-way" factor exposures and large active sector bets that lack investment intuition.

Conclusion

In summary, the levels of concentration and style risk often embedded in cap-weighted indices have many investors looking for solutions that mitigate these unwanted exposures. Although equal weighting may provide some relief in terms of concentration and style exposure, the accompanying volatility, uncompensated risk exposures, and heightened turnover outweigh the benefits. We suggest that an efficiently constructed, active approach can offer at least the same benefits as an equal weighed index, but with a significantly better balance toward well-compensated sources of risk, reduced exposure to unwanted risks, and ultimately a more efficient performance profile over time.

References and Footnotes

1. Carhart, Mark M. "On persistence in mutual fund performance." The Journal of finance 52.1 (1997): 57-82.
2. Choi, James J., and Kevin Zhao. Did Mutual Fund Return Persistence Persist?. No. w26707. National Bureau of Economic Research, 2020.
3. Fama, Eugene F., and Kenneth R. French. "A five-factor asset pricing model." Journal of financial economics 116.1 (2015): 1-22.
4. Hunstad, Michael and Robert Lehnherr. “Foundations in Factors.” Northern Trust Research Paper (2019).