



Mind the Cap: Overcoming Limitations of Market Capitalization-Weighted Indices



Key Highlights

Market capitalization-weighted indices, such as the S&P 500® Index, allocate to underlying stocks proportionally based on value (shares outstanding x current price).

While easy to understand, this approach may introduce significant risks that investors may not be aware of, such as individual stock and sector concentration and momentum biases.

Strategic or “smart” beta—a more disciplined approach to portfolio construction—may reduce these risks while delivering many of the typical benefits of a passive approach, such as low cost.

In particular, a risk-based smart beta approach reduces the shortcomings of traditional indices by considering volatility and correlation in stock selection and portfolio construction.

Summary

Although investors have widely embraced traditional market indices for their simplicity and familiarity, they may not be aware that these indices may introduce unintended risk in their portfolios. Briefly stated, traditional market capitalization-weighted indices, such as the S&P 500® Index, determine the weights of individual stocks in the index by simply allocating pro-rata based on the outstanding value of the constituent companies. While this approach is intuitive, it can result in growth and momentum biases, as well as increasing individual stock and sector concentration which often comes precisely before a decline in those stocks.

This whitepaper discusses the unintended risk investors may be taking when investing in capitalization-weighted indices. To overcome these limitations, we will show how allocating a portion of an investor’s passive exposure to more thoughtfully constructed indices—often called “strategic or smart beta”—can potentially reduce risk without sacrificing upside participation.



What are the unintended risks inherent in market cap-weighted indices?

Many of the widely quoted traditional market indices use market capitalization to determine their allocation to underlying investments. Market capitalization simply refers to the total value of the stock as defined by its shares outstanding multiplied by their current share price. It may be helpful to think of market capitalization as the amount an investor would have to pay if he or she were to write a check to purchase the entire company.

Once the market capitalization is determined for each stock in the eligible universe, allocations are made pro-rata based on the relative value of each stock's market capitalization. For illustration, consider a hypothetical index comprised of two stocks, Stock A and Stock B. If each stock has the same number of shares outstanding, but Stock A is priced at \$20 and stock B is priced at \$10, then Stock A would account for twice as large of an allocation as Stock B.

	Shares Outstanding	Stock Price	Market Capitalization	Weight
Stock A	1,000,000	\$20.00	20,000,000.0	67%
Stock B	1,000,000	\$10.00	10,000,000.0	33%

Market cap-weighted indices are common not only among equities, but also other asset classes such as fixed income. For example, the S&P 500 Index and the Bloomberg Barclays US Aggregate Bond Index use this approach.

Until recently, few investors have questioned this approach, perhaps operating under the mistaken belief that all indices represent "the market," and thus are completely neutral and free from bias. In reality, market cap-weighted indices may introduce significant unintended risks by the very nature of their portfolio construction.

One such example of unintended risk is having a momentum bias. Particularly in extended bull markets, when rising stock prices can create a self-fulfilling prophecy such that the stocks that perform best see their market capitalization increase the most, thus becoming even larger allocations within the index.

In an age where passive investing has risen in popularity, a vicious cycle can ensue, whereby more money flowing into index funds is proportionally allocated to top-performing stocks, which may further drive up their prices. Importantly, this increase in allocation can disconnect from fundamentals: since a market cap-weighted index ignores valuation, earnings, and even revenues, there is no "sanity" check on the portfolio. Stated differently, market cap-weighted indices never sell or even trim their winners, in essence making a bet that yesterday's success stories will also be winners in the future. As a result, market cap weighted indices often exhibit an inherent growth bias, even though investors tend to think of these investments in neutral terms (i.e., somewhere between value and growth investments).

Far from a theoretical issue, the momentum bias has also manifested itself through large distortions in sector allocations in cap-weighted indices, at times with quite negative effects. By letting its winners run, a cap-weighted index also leaves growing sector weights unchecked. For instance, the S&P 500's exposure to the Technology sector increased dramatically in the 1990s, culminating with a weighting that peaked just around the time that the sector suffered an 80% decline. Nor was this a one-time event: from 1990 to 2007, the S&P's exposure to Financials nearly tripled from 7% to 22% just before the Financial Crisis struck, with stocks in that sector plunging 76%. The 2016 and 2017 rally in Alphabet (a.k.a., Google), Amazon, and their peers has once again led to a significant increase in the S&P 500's Technology weighting, leading some to wonder if history is about to repeat itself.

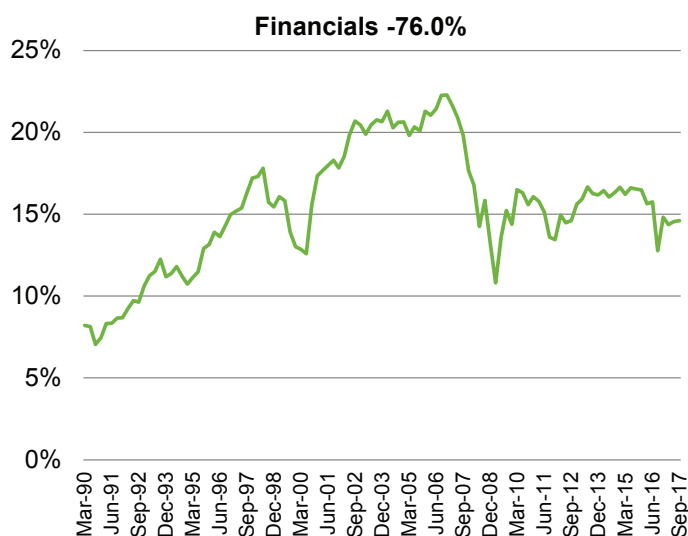
How can smart beta overcome these limitations?

In recent years, a number of new approaches to passive exposure have proliferated. Collectively, products providing passive exposure through means other than a cap-weighted approach have come to be known as smart beta. Smart beta is generally viewed as an evolution in passive investing because the approach blends systematic, non-discretionary investing with improved portfolio construction techniques.

Smart beta strategies are not a homogenous group. There are many different approaches to portfolio construction that are grounded in fundamental considerations. Academics and



S&P 500 Sector Weights (March 1990 – September 2017)



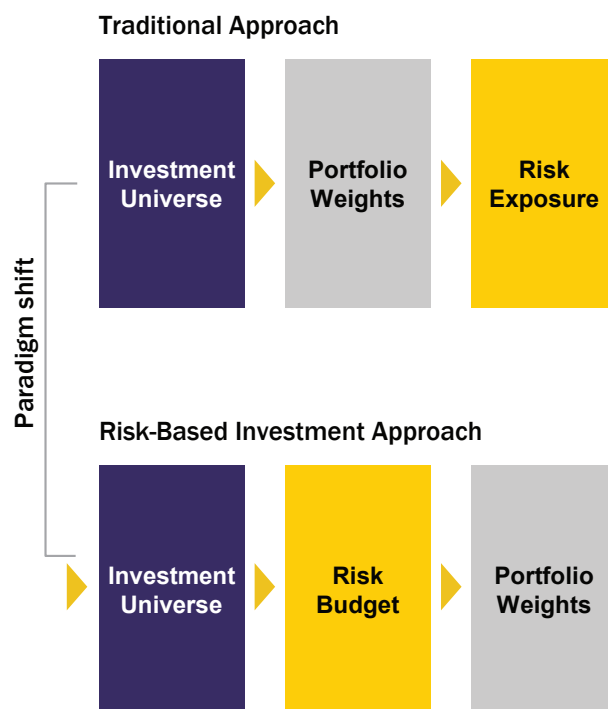
- Post-repeal of Glass-Steagal during the credit boom, financials roughly tripled from 7% to 22%
- Due to cap-weighting, the index created a maximum exposure just as Financial stocks plummeted 76%
- A risk-focused approach may have avoided such an over-concentration

Past Performance is no guarantee of future performance and performance may vary over time.

practitioners alike have debated whether or not an allocation system based on corporate earnings or revenues might better reflect economic reality than the traditional approach's reliance on market value; some have even argued for simply equal-weighting, so that an index of 100 stocks would limit momentum and sector risk by allocating 1% to each stock in the portfolio.

If the primary reason for considering an alternative to the unintended risks of a cap-weighted index, it only makes sense that investors consider a smart beta strategy with a thoughtful approach to risk. Traditionally, both active and passive investment strategies have included risk controls on the back end of their investment processes—in other words, stocks are selected based on conviction, with constraints on position size (e.g., no stock can comprise more than 5% of the portfolio).

Today, a more direct approach is to put the horse back in front of the cart: rather than treating risk as a byproduct of the selection and allocation process, it makes more sense to introduce risk controls on the front end of the investment process. The level of stock specific risk—whether measured by volatility, correlation, or ideally both—can be used to both select securities and determine their appropriate allocation within the index.



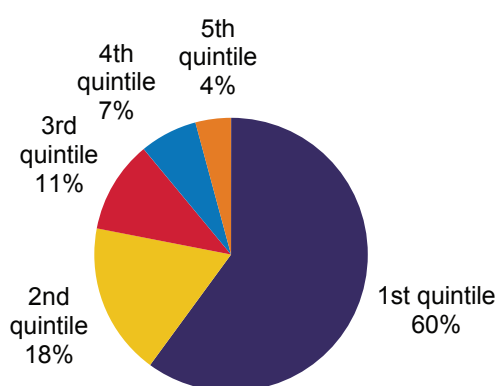


An approach that considers correlation in addition to volatility (i.e., standard deviation) tends to be much more effective at controlling risk. If correlation is ignored, then portfolio construction can be flawed; what seems like diversification amounts to little more than owning many different stocks that behave similarly. Stated differently, investors may put their eggs in different baskets, but if all of the baskets deliver similar results, the attempt at risk control may not succeed.

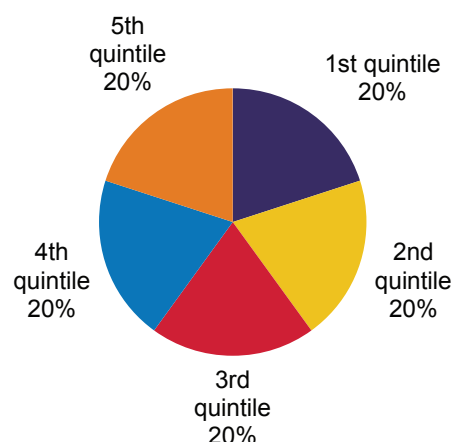
A more effective approach to controlling risk considers how certain stocks “zig” when others “zag.” The value added through this approach, sometimes referred to as de-correlation, can be seen when comparing the R Risk-Based US IndexSM to market cap-weighted indices. For example, while the S&P Index is comprised of 500 stocks, 100 stocks account for 60% of the risk. While investors in the index own a great many stocks, they are not necessarily fully diversified.

Risk Contribution of US Market Cap Weighted Benchmark (as of December 2016)

S&P 500 Index Risk Contribution by Quintile



R Risk-Based US IndexSM | Risk Contribution by Quintile



Conversely, a specific smart beta strategy called equal-risk contribution not only incorporates correlation analysis, but also uses this statistic along with volatility to determine portfolio weights. Through the use of a correlation matrix, portfolio weights are derived such that the risk contribution—the product of each stock’s volatility, correlation, and weighting—of each stock in the portfolio is equal. For example, a stock that is highly volatile and tends to “zig” when other stocks also “zig” would receive a low allocation, whereas a low volatility, low correlation stock would receive a higher weighting.

How should investors incorporate smart beta into their overall investment allocations?

As demonstrated above, an equal risk contribution approach can overcome many of the limitations of cap-weighted indices; the next consideration is how to use such a building block in the context of an investor’s overall portfolio. Though there are variations, we see three primary options.

Option 1: Passive Core

One obvious application for smart beta strategies such as equal risk contribution is as a passive core allocation. While equal risk contribution offers many improvements over market cap-weighted indices, we suspect that many investors may wish to start slowly. For an investor with a 20% allocation to a traditional index, paring that back to 15% combined with a 5% allocation to a risk-based strategy has the potential to improve the risk/reward profile of the overall portfolio.

Option 2: Replacement for Active Management

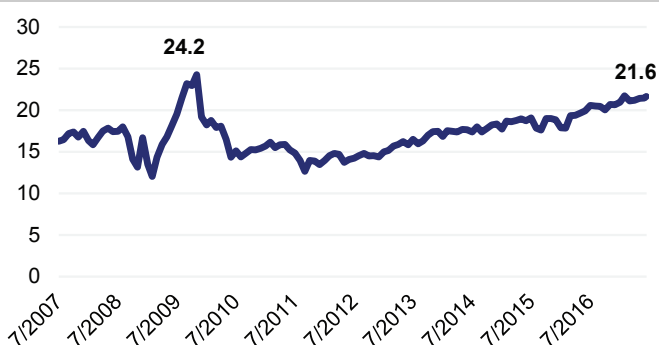
Although active management has proven quite successful in niche strategies such as small cap and international equities, large cap managers have been less successful in beating their benchmarks in recent years. Reallocating a portion of an investor’s actively managed large cap allocation to an equal risk contribution strategy can potentially reduce costs, reduce risk, and improve returns.



Option 3: Tactical Allocation

After nearly a decade-long bull market, many observers have grown concerned over equity valuations. The S&P price-to-earnings ratio recently stood at 21.6, a level not seen since just before the Financial Crisis.

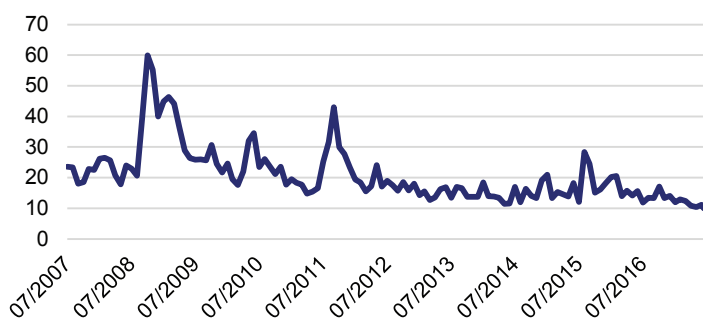
S&P 500 Index Price Earnings Ratio



Source: Bloomberg

Volatility, as measured by the CBOE VIX Index, remains near historic lows, but this could change. Markets often operate under a “mean reversion” principle, wherein outliers tend to converge back to historical averages.

VIX Index

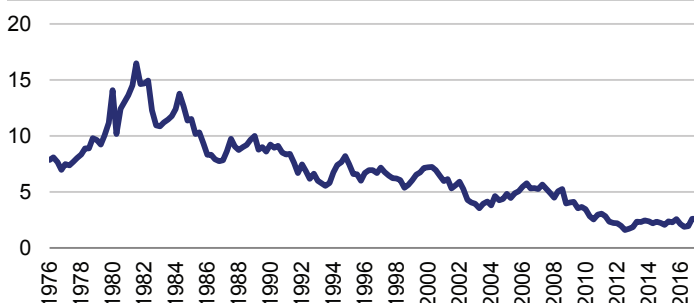


Source: Bloomberg

In addition, the VIX spiked roughly 60% in August due to geopolitical developments at home and abroad. The threat of a government shutdown led to questions about the Trump Administration’s ability to pass pro-growth reforms. Overseas, North Korean missile tests have raised the level of tension in the region, with armed conflict being a real possibility.

Normally, investors could hedge such concerns with a greater allocation to fixed income, yet an even longer bull market in bonds, combined with rising interest rates, may give some investors pause.

Bloomberg Barclays US Agg Index Yield to Worst



Source: Bloomberg

Although modest growth and tame inflation have provided a benign backdrop, risk-based strategies may offer market participants a way to guard against a spike in volatility without missing out on continued upside. Additionally, a risk-based approach that invests in stocks that have historically demonstrated less volatility may help to lessen the impact of a market decline.

Conclusion

The potential risks of market cap-weighted indices are often overlooked by investors. Traditional indices may have growth, momentum, and mega-cap biases, along with concentrated—and often ill-timed—sector exposure. Smart beta solutions such as the equal risk contribution approach have the potential to reduce portfolio drawdowns and improve the Sharpe Ratio (a measure of reward per unit of risk).

Key Takeaways

1. Investors may be underestimating portfolio risk when investing in market cap-weighted indices.
2. Moving risk controls to the front-end of the investment process is likely to be more effective than including sector and position limits after the investment selection process.
3. Risk-based strategies allow investors to capitalize on the power of decorrelation, potentially improving the risk-reward framework.



Disclaimer:

This presentation is provided for informational purposes only and is not intended to and does not provide a recommendation with respect to any security. This presentation is confidential to the recipient and must not be reproduced or distributed to any other person without the prior written consent of Rothschild Asset Management Inc. ("Rothschild"). This presentation has not been independently verified, is subject to updating and amendment and the material, information and descriptions contained herein are not intended to be complete. This presentation does not constitute investment advice and only represents the opinion of the investment adviser, which is subject to change without notice.

Nothing in this presentation should be construed as an offer, invitation or solicitation of an offer to invest in a fund ("Fund") managed by Rothschild. This presentation does not take into account the financial position or particular needs or investment objectives of any individual or entity. This presentation is not intended to provide recommendations, and should not be relied upon, for accounting, legal, tax advice or investment purposes. You should consult your tax, legal, accounting or other advisers separately with respect to your decision to invest with Rothschild.

The targeted returns presented herein are hypothetical in nature and are shown for illustrative, informational purposes only. Such targeted returns are not intended to forecast or predict future events, but rather to indicate the returns for investments that Rothschild seeks to achieve on a fund's overall portfolio of investments. It does not reflect the actual or expected returns of any portfolio strategy. Such target returns are based on Rothschild's belief about the returns that may be achievable on investments that a fund intends to pursue in light of the experience of Rothschild with similar investments historically, their view of current market conditions, potential investment opportunities that Rothschild is currently or has recently reviewed, availability of financing and certain assumptions about investing conditions and market fluctuation or recovery. Targeted returns on specific investments are based on models, estimates and assumptions about performance believed to be reasonable under the circumstances. There is no guarantee that the facts on which such assumptions are based will materialize as anticipated, that market conditions will not deteriorate or that investment opportunities satisfying a fund's targeted returns will be available. Any changes in such assumptions, market conditions or availability of investments may have a material impact on the target return presented. Actual events and conditions may differ materially from those used to establish target returns. Any target return is hypothetical and is not a guarantee of future performance. Prospective investors are encouraged to contact the representatives of Rothschild to discuss the procedures and methodologies (including assumptions) used to calculate the targeted returns.

An investment with Rothschild will entail investment risk, including the possible loss of a substantial part, or even the entire amount, of such investment. Investment with Rothschild is suitable only for sophisticated investors and requires the financial ability and willingness to accept the high risks of the investment. Any projections, market outlooks or estimates in this presentation are forward looking statements and are based upon certain assumptions. Other events which were not taken into account may occur may significantly affect the returns or performance of an investment strategy. Any projections, outlooks or assumptions should not be construed to be indicative of the actual events which will occur.

Past performance is not necessarily indicative of future results. None of Rothschild, nor any of its directors, officers, employees, shareholders, advisers, agents or affiliates (together the "Rothschild Parties") make any representation or warranty, express or implied as to the accuracy or completeness of this presentation, and nothing contained herein shall be relied upon as a promise or representation whether as to past or future performance. There can be no assurance that Rothschild will achieve comparable results or that Rothschild will be able to implement its investment strategy or achieve its investment objectives. To the maximum extent permitted by law, none of the Rothschild Parties shall be liable (including in negligence) for direct, indirect or consequential losses, damages, costs or expenses arising out of or in connection with the use of or reliance on this presentation.

Contact us

New York
Rothschild Risk Based Investments LLC
1251 Avenue of the Americas
New York, NY 10020

Mark Burns
T: +1 212 403 5282
E: Mark.Burns@Rothschild.com

www.rothschild.com