

Russell 1000 Equal Weight Index: Equal weighting refined

Attention has been increasingly drawn to alternative index-weighting solutions for reducing portfolio concentration – or the risks that can arise when a handful of stocks or sectors comprise an inordinately large share of standard market cap-weighted indexes. Equal weighting, which assigns equal representation to each index constituent, is the oldest and most time-tested of these alternatives, offering diversification and other risk-mitigating benefits.¹

This paper explores the key benefits of equal weighting over their cap-weighted counterparts and compares the attributes and return histories of simple constituent-only construction methodologies with those of the Russell 1000[®] Equal Weight Index (R1000 EW), which takes a two-pronged equal-weighting approach to reduce concentration risk and enhance diversification.

Equal weighting takes a different path

Because of the way they are constructed, equal-weighted indexes are inherently more diversified than their cap-weighted counterparts, mainly because they allow for greater exposure to the historically higher risk premium of midcap stocks. In an important differentiation, the R1000 EW takes this diversification one step further by first assigning equal weights to each economic sector and then equal weighting stocks within each sector.

In this paper, we outline how the R1000 EW differs from simple constituent-only approaches and how these distinctions can impact performance over time. Key differences include:

- **Less volatility.** The R1000 EW's enhanced sector-weight diversification approach has reduced the higher volatility of traditional constituent equal-weighting that arises from the increased exposure to midcap stocks.
- **Downside cushion in crises.** The R1000 EW has also provided downside protection over time. It has seen smaller drawdowns than both its cap-weighted and constituent-only equal-weighted counterparts during the dotcom bubble bust and global financial crisis (GFC) and took less time to fully recover.
- **Strong long-term performance record.** As we will show, this enhanced diversification has enabled the R1000 EW to outperform the cap-weighted and a hypothetical constituent-only equal-weight index over the long term.

Equal index weighting has gained interest as a way to diminish the risks of excessive concentration that can arise with standard cap-weighted indexes

The Russell 1000[®] Equal Weight Index equal weights sectors, then also the stocks within sectors to reduce volatility and drawdowns versus traditional constituent-only approaches

¹The first equal weighted index was created by Wells Fargo Bank in 1970. See Moroz and Kose (2014) "The High Cost of Equal Weighting" *Research Affiliates*

Why equal weighting?

Many investors use products that replicate market-cap indexes in their portfolios. Low cost, transparency and exposure to a large number of stocks are among the benefits of such a passive approach. But this approach may offer less diversification than first meets the eye. That is because many cap-weighted and sector indexes are dominated by the largest stocks and a few heavily weighted sectors. Often, as go the mega caps, so goes the returns of the whole index. This concentration risk means that a cap-weighted index actually may provide the diversification equivalence of only a fraction of the number of stocks in the index.

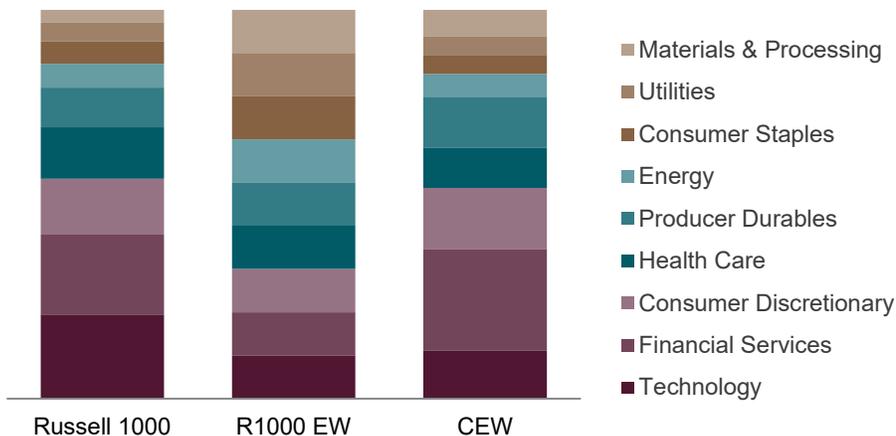
Moreover, the equal weighted approach shifts exposures down to midcap stocks. Midcaps offer an additional layer of diversification because their return patterns tend to differ from those of mega caps. Midcaps are often in the early stages of their business lifecycles and among the most innovative of companies. Some may even become the mega caps of tomorrow, offering upside return potential.

The R1000 Equal Weight Index enhancement: equal-weighted sectors

In this paper, we compare three indexes: the standard cap-weighted Russell 1000, the Russell 1000 Equal Weight Index (R1000 EW), which equal weights sectors and stocks within sectors, and a hypothetical R1000 Constituent Equal Weight index (CEW), which gives equal weight to each stock without regard for sector weight (Exhibit 1).

The R1 EW's two-step weighting approach targets a balanced sector exposure

Exhibit 1: Sector weights (% of index) - Russell 1000 Equal Weight, Russell 1000 and hypothetical Constituent Equal Weight (CEW)



Source: FTSE Russell. Data as of June 30, 2018. Past performance is no guarantee of future results. The Russell 1000 constituent equal weight index (CEW) is a hypothetically created index and is not a FTSE Russell index, and the data shown for the CEW represents hypothetical historical performance. Please see the end for important legal disclosures.

Cap-weighted indexes allow market prices to dictate their sector allocations. This means these indexes have the most exposure to the strongest performers in the past, not necessarily those that will do well in the future.

But an index that equally weights all its constituents has a different problem: sector allocations are determined solely by the number of companies in each sector. This means that sector weights in a hypothetical constituent equal

weighted version of the Russell 1000® Index would vary from 5% to 26%, based on nothing more than the number of names in the sector. To remedy this, the R1000 EW first equal weights all sectors and then equal weights all stocks within each sector. Removing this kind of sector risk, we argue, is much more in the spirit of equal weighting as a solution for improving portfolio diversification.

As Exhibit 1 illustrates, while the R1000 EW maintains consistent allocations across sectors, the CEW and the Russell 1000 both have disproportionate weights in several sectors. For example, the CEW index has a large percentage of financial services and consumer discretionary holdings, and a fairly small allocation to consumer staples, while the Russell 1000 is skewed more toward technology and financial services and less to materials. In examining these data over the past 15 years, we find that these sector profiles have been fairly persistent over time. That said, the consistent and stable equal allocations to sectors offered by the R1000 EW allow a more neutral approach.

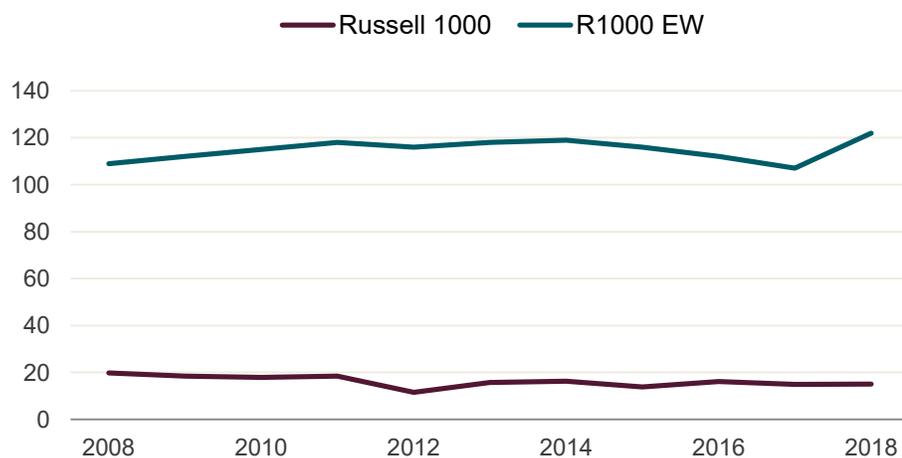
Equal sector weighting enhances diversification

The R1000 EW methodology takes a complete diversification approach by equal-weighting stocks within each sector as well as equal-weighting sectors. Equal weighting stocks within sectors prevents sectors from becoming overpowered by their most heavyweight constituents. For example, mega-cap tech giants Microsoft, Apple, Facebook and Intel have dominated the Russell 1000's technology sector, accounting for 42% of the sector's capitalization (as of June 30, 2018). In the R1000 EW, these same companies account for just 3.3% of the technology sector, allowing many more midcap tech companies to join the lineup.

A precise method of quantifying the degree of an index's diversification is by calculating its "Effective N." At the stock level, this metric can be interpreted as the hypothetical number of stocks that drive an index's historical risk and return. The lower the Effective N, the higher the index's concentration. Exhibit 2 shows the effective number of stocks in the technology sector for the Russell 1000 and the R1000 EW since 2006.

The R1 EW also offers access to a more expansive array of companies across sectors than the Russell 1000

Exhibit 2: Technology stock-level effective N - Russell 1000 Equal Weight and Russell 1000 Indexes



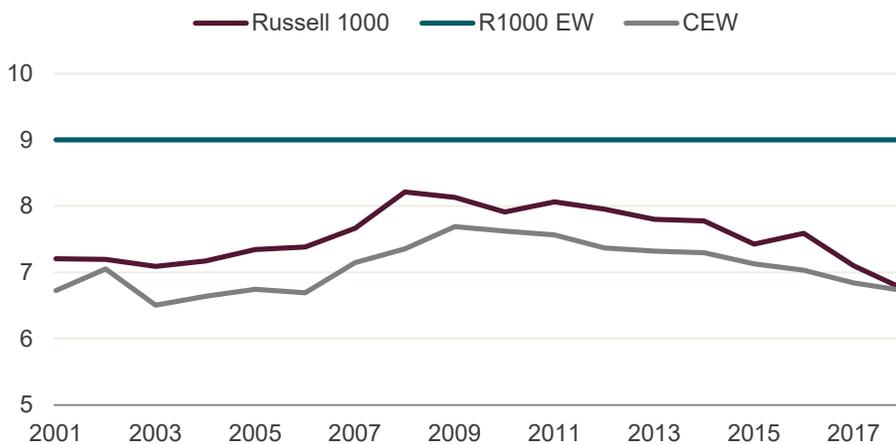
Source: FTSE Russell. Data June 30, 2006, through June 30, 2018. Past performance is no guarantee of future results. Please see the end for important legal disclosures.

Over this period, the Russell 1000 has remained highly concentrated, with an Effective N generally ranging between 15 and 20. The Effective N of an equal-weighted index is equal to the number of stocks in the index, so the Effective N of the R1000 EW has generally ranged between 100 to 125 stocks, making it the most diversified sector portfolio possible.

Sector selection is known to be a major driver of market returns and, as our research indicates, a more balanced sector exposure can play an important role in mitigating risk. Exhibit 3 shows the Effective N calculated at the sector level, or the effective number of sectors in the index.

Sector selection has proven to be a reliable driver of stock-market returns over time

Exhibit 3: Sector effective N - Russell 1000, Russell 1000 Equal Weight and Constituent Equal Weight (CEW) Indexes



Source: FTSE Russell. Data as of June 30, 2018. Past performance is no guarantee of future results. The Russell 1000 constituent equal weight index (CEW) is a hypothetically created index and is not a FTSE Russell index, and data shown for the CEW represents hypothetical historical performance. Please see the end for important legal disclosures.

This exhibit highlights the shortcomings of using a simple stock-level equal-weighted approach: the CEW index has an even higher sector concentration than the cap-weighted Russell 1000. The R1000 EW, on the other hand, has the highest possible Effective N, as it perfectly matches the number of sectors.

Equal sector weight methodology: lower risk and drawdown

Exhibit 4, next page, compares the annualized volatility of the R1000 EW, CEW and Russell 1000 since July 2004. Because of their greater exposure to more volatile midcap stocks, equal-weighted indexes are typically more volatile than cap-weighted indexes. Notably, however, the R1000 EW has frequently exhibited the same or lower volatility than the hypothetical CEW, particularly during the 2000-2002 and 2008-2010 periods, when trailing volatility was manifesting the market turmoil in the aftermath of the dotcom bubble burst and the GFC.

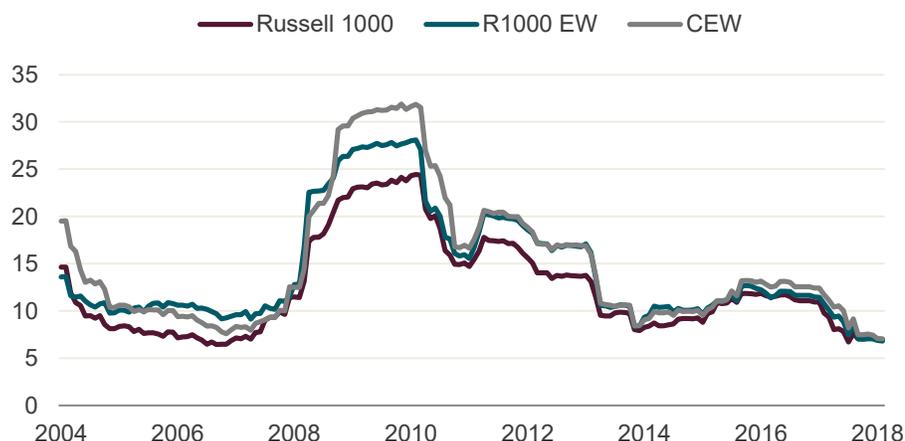
The R1 EW has shown the same or lower volatility than a simple constituent-only approach over time, particularly in times of crisis

Given the higher overall risk of equal-weighted indexes, investors rightly focus on how these indexes perform during periods of acute market stress. Exhibit 5, next page, compares the drawdown and recovery statistics for the R1000 EW, the CEW and the Russell 1000 during the dotcom bust of 2000-2002 and the global financial crisis (GFC) of 2007-2009. Cap-weighted indexes had become overly

concentrated in certain sectors in the run-up to both crises after extended bouts of robust outperformance.

As shown, the R1000 EW saw lower drawdowns than either the CEW or the Russell 1000 during both crises, and reached full recovery more quickly than the Russell 1000. This was driven in part by the R1000 EW's smaller respective exposures to technology and financials, a direct result of its construction methodology.

Exhibit 4: Annualized standard deviation (24-month-rolling volatility) - Russell 1000 Equal Weight, Russell 1000 and Constituent Equal Weight (%)



Source: FTSE Russell. Data from June 30, 2003 through July 31, 2018. Past performance is no guarantee of future results. The Russell 1000 constituent equal weight index (CEW) is a hypothetically created index and is not a FTSE Russell index, and data show for the CEW represents hypothetical historical performance for illustrative purposes. Please see the end for important legal disclosures.

The R1 EW fell less and recovered more quickly than the Russell 1000 during the past two market crises

Exhibit 5: Drawdown and recovery statistics—Russell 1000 EW, Constituent Equal Weight and Russell 1000 Indexes during the dotcom bust and the global financial crisis

	Drawdown	Date of Full Recovery	Months to Full Recovery
Dotcom Bust (Aug. 2000–Sept. 2002)			
R1EW	-24.8%	Jul-03	36
CEW	-32.9%	Dec-03	41
Russell 1000	-45.1%	Oct-06	75
Global Financial Crisis (Oct. 2007–Feb. 2009)			
R1EW	-50.8%	Oct-10	37
CEW	-53.2%	Apr-10	31
Russell 1000	-51.1%	Mar-12	54

Source: FTSE Russell. Data as of August 31, 2018. Past performance is no guarantee of future results. The Russell 1000 constituent equal weight index (CEW) is a hypothetically created index and is not a FTSE Russell index, and data shown for the CEW represents hypothetical historical performance for illustrative purposes. Please see the end of this report for important legal disclosures.

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The down-market capture ratio (DMCR) is another way to evaluate how an index behaves during market downturns. It is calculated as the average index return divided by the average benchmark return, using data only for months when the benchmark has declined. A DMCR below 100% means that the index fell less than the market (in this case, the Russell 1000) during down markets, and a ratio in excess of 100% means the index fell more than the market.

R1 EW's equal sector weighting has shown more reliable long-term downside-mitigating effects than the hypothetical constituent-only index

Exhibit 6: Calendar-year down market capture ratios - Russell 1000 Equal Weight vs Constituent Equal Weight



Source: FTSE Russell and Morningstar. Data from June 30, 2002 through July 31, 2018. Past performance is no guarantee of future performance. The Russell 1000 constituent equal weight index (CEW) is a hypothetically created index and is not a FTSE Russell index, and data shown for the CEW represent hypothetical historical performance for illustrative purposes. Please see the end for important legal disclosures.

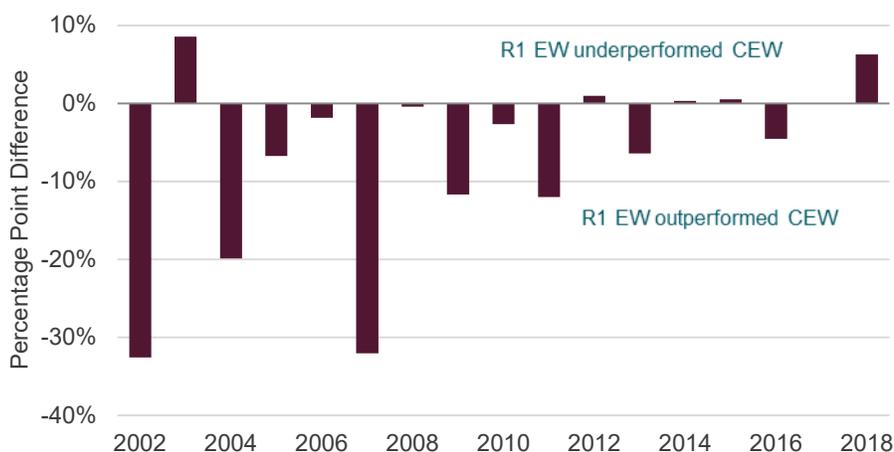
Since June 2002, the DMCR has averaged 105% for the R1000 EW versus 117% for the CEW. The R1 EW's in-line downside performance relative to the benchmark demonstrates the risk-mitigating effects of the equal sector weighting methodology over a simple constituent-only approach (Exhibit 6).

Exhibit 7, next page, shows the difference between the annual DMCRs of the R1000 EW and CEW since 2002. One way to assess these numbers is to look at how much the DMCR increased when moving from a simple constituent equal weighting (CEW) to a equal sector weighting (R1000 EW). Since investors want a low DMCR, they would want to see reductions in the DMCR, indicated by negative differences. As the exhibit shows, the R1000 EW

frequently demonstrated a reduction in DMCR compared to the simple stock-level equal-weighted CEW, reflecting the greater diversification benefits of the equal sector weighting approach. These DMCR reductions were often quite significant, amounting to more than 10 percentage points in six of the years examined and of more than 30 percentage points in two of those years. In the years in which sector diversification led to an increase in DMCR, the difference tended to be small. There were only two years when the increases were larger than five percentage points, and they were never higher than 10 percentage points.

The R1 EW's DMCR was more than 10 percentage points lower than that of the hypothetical constituent-only in six of the years since 2002

Exhibit 7: Difference in down market capture ratios - Russell 1000 Equal Weight vs Constituent Equal Weight



Source: FTSE Russell and Morningstar. Data from June 30, 2002, through July 31, 2018. Past performance is no guarantee of future performance. The Russell 1000 constituent equal weight index (CEW) is a hypothetically created index and is not a FTSE Russell index, and data shown for the CEW represents hypothetical historical performance for illustrative purposes. Please see the end for important legal disclosures.

The R1000 EW factor “signature”

In Exhibit 8, we show the biggest active exposures of the R1000 EW (i.e., underweights and overweights relative to the Russell 1000, the underlying cap-weighted benchmark) to five standard factors, based on the FTSE Russell factor methodology. This exhibit illustrates what might be called the factor “signature” of an equal-weighted index. What stands out most is the R1000 EW’s pronounced exposure to the “small size” factor compared to its cap-weighted counterpart, which mainly arises from the equal-weighted index’s tilt to midcap stocks. This midcap stock exposure is a key driver of the R1000 EW’s relative performance.

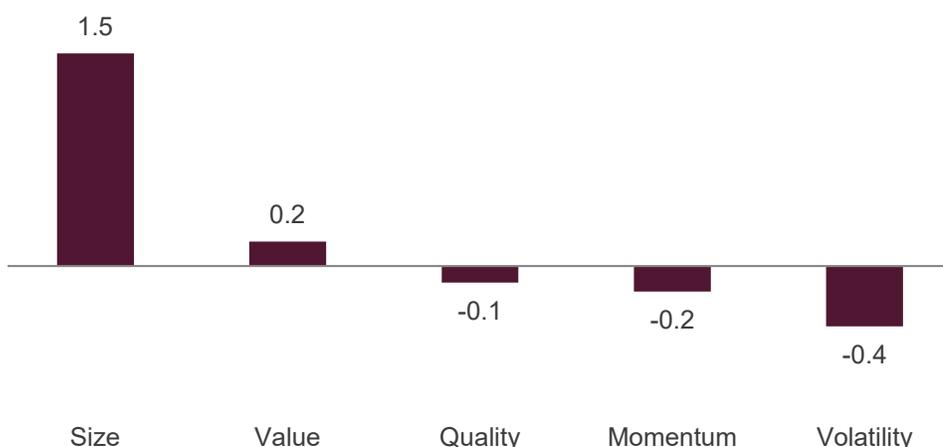
Midcap stocks often get less attention from analysts and investors than their better-known mega-cap peers. For example, as of June 2018, data vendor IBES estimated that an average of 14 analysts provided forward-looking forecasts for midcap stocks, versus 23 analysts for mega-cap stocks. Midcap companies may benefit from leaner, less hierarchical organizational structures than their larger peers, making them more flexible and quicker to respond to changing business conditions or competitive threats. Despite their smaller size, they often hold leading market positions, and generally a keener focus on niche or newer

The R1 EW has a pronounced exposure to the “small size” factor relative to the benchmark, an outgrowth of its tilt to midcap stocks

emerging-growth markets. Midcap stock returns may also benefit as they grow and migrate from small cap indexes into larger cap indexes.

The exposures to the other factors shown in Exhibit 8 are modest and, therefore, not key drivers of the R1000 EW's risk/return profile. For example, the positive exposure to value over the cap-weighted benchmark largely reflects the fact that equal weighting avoids the excessive concentration effects that can occur as a result of the crowding into popular growth stocks in cap-weighted indexes. The negative exposure to low volatility is just another way of measuring R1000 EW's higher volatility as a result of its tilt to more volatile midcap stocks.

Exhibit 8: Active factor exposures (Z scores) - Russell 1000 Equal Weight relative to the Russell 1000 Index



Source: FTSE Russell. Data as of June 25, 2018. Past performance is no guarantee of future results. Please see the end for important legal disclosures. The units are Z scores, which are the number of standard deviations versus a mean of zero.

The R1 EW construction methodology applies an extra screen, designed to avoid potential capacity issues

Capacity and rebalancing

A minimum level of liquidity for constituents in the R1000 EW is established because it draws from the Russell 1000 universe, in which all constituents have already passed a rigorous liquidity screen. However, the R1000 EW's tilt toward the lower portion of the cap spectrum raises another concern: it may result in large stakes in the holdings of some companies if a substantial amount of assets flow into products replicating the R1000 EW, which could pose a liquidity risk down the road.

To address this issue, the R1000 EW methodology applies an additional screen prior to the construction of the index, designed to remove securities whose available market value may not support significant investment. To be eligible for membership, the share position of a potential constituent cannot exceed 5% of the float-adjusted shares of a company, when a notional value of \$5 billion is assumed to be invested in the portfolio.

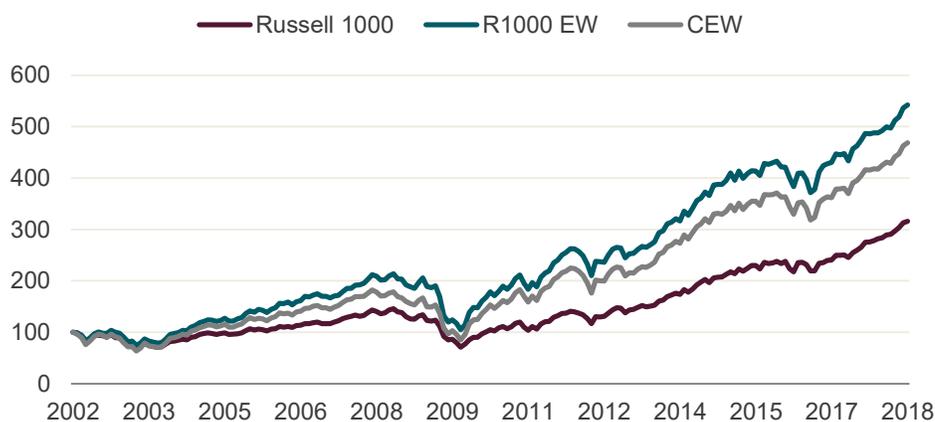
At rebalance, the weights of the R1000 EW constituents are synched up to match the methodology. This results in contrarian trading in whatever stocks and sectors have been trending up or down, exemplifying a disciplined contrarian "buy low, sell high" approach. A perfect implementation of the methodology

would require sectors and constituents to rebalance daily. However, that would require trading constituents' shares every day to keep the weights constant and would increase transaction costs for replicated portfolios. Thus, there is a trade-off between timely representation of the methodology and turnover. Our research has determined that quarterly rebalancing strikes a reasonable balance between minimizing turnover while also enforcing a contrarian market discipline.

Historical performance

Exhibit 9 plots the cumulative performance of the R1000 EW Index since June 30, 2001, compared with that of its cap-weighted counterpart and the hypothetical constituent equal weight (CEW) index. This return history underscores the long-term benefits of the more fully diversified R1000 EW methodology: because its drawdowns were lower than the other two indexes during major market corrections, the R1000 EW was better positioned once markets recovered. This lower risk drag ultimately led to a stronger long-term performance.

Exhibit 9: Cumulative returns – Russell 1000, R1000 Equal Weight and Constituent Equal Weight (rebased)



Source: FTSE Russell and Morningstar. Data from June 30, 2002, through July 31, 2018. Past performance is no guarantee of future performance. The Russell 1000 constituent equal weight index (CEW) is a hypothetically created index and is not a FTSE Russell index, and the data shown for the CEW represent hypothetical historical performance for illustrative purposes. Please see the end for important legal disclosures.

Exhibit 10: Historical performance statistics - Russell 1000 Equal Weight, Constituent Equal Weight and Russell 1000 since July 31, 2001

	Annualized Return	Annualized Volatility*	Return/Risk Ratio
R1000 EW	10.7%	16.5%	0.65
CEW	9.8	18.1	0.54
Russell 1000	7.4	14.2	0.52

Source: FTSE Russell. Data as of June 25, 2018. Past performance is no guarantee of future results. Please see the end for important legal disclosures. *Units are standard deviations.

For the entire 17-year period, the R1000 EW achieved higher annualized returns than the CEW with far less volatility (Exhibit 10). The reduction in risk from 18.1% to 16.5% combined with a three percentage-point increase in annualized return to translate into a risk-adjusted return of 0.65, or more than 20% above the CEW's 0.54. Despite its higher volatility, the R1000 EW also generated a higher risk/return trade-off than the Russell 1000.

Summary

Equal-weighted indexes are one of the earliest examples of “smart beta” indexes. They have long been popular for their ability to diversify the mega-cap dominance inherent in cap-weighted indexes. Likewise, rebalancing to equal-weight causes the index to increase the weight of stocks that have recently declined and decrease the weight of stocks that have recently risen. This contrarian trading pattern (“buy low, sell high”) is a key component of the equal-weighting methodology.

However, simply equal weighting by constituents does not necessarily provide diversification at the sector level, so constituent equal-weighted indexes still have significant sector biases as do their cap-weighted counterparts. The FTSE Russell methodology of equal-weighting sectors eliminates this risk. The benefits of this approach were illustrated most clearly during the dotcom bust and the GFC, when both the cap-weighted Russell 1000 and a hypothetical CEW underperformed the R1000 EW. This underperformance resulted in part from both indexes' overweights in technology and financial services stocks, respectively – previously popular sectors that led the market losses when the crises struck.

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