

Russell Equal Weight Indexes: Analyzing the drivers of historical outperformance

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The introduction of non-market-cap-weighted indexes and the growth of “smart beta” indexes mark one of the index industry’s most significant innovations of recent years. Among non-cap-weighted indexes, equal-weighted indexes have the least complex methodology and the longest history, having first been introduced more than a decade ago in 2003.² Using a methodology that reflects agnostic beliefs with respect to expected returns, equal-weighted indexes were among the first to break the link between a stock’s price and its weight in the index.

Research has shown that equal-weighted index strategies can outperform their cap-weighted parent indexes over time.³ However, some observers have questioned whether that outperformance is driven by higher exposure to the small cap factor and thus is simply a result of taking greater risk. Others have highlighted potential implementation issues due to capacity constraints, liquidity concerns among smaller cap constituents, and high turnover because of the need for frequent rebalancing.

Russell Investments introduced its Equal Weight Indexes in 2010. The series is designed to help alleviate potential sector biases, as well as capacity constraints and liquidity issues, by using a unique methodology that first equal-weights economic sectors and then equal-weights stocks within those sectors.⁴

¹ The authors gratefully acknowledge the comments and suggestions by Rolf Agather, Scott Bennett, David Cariño, Mary Fjelstad, Tom Goodwin, Evgenia Gvozdeva, Pradeep Velvadapu, and Catherine Yoshimoto in the writing of this paper.

² Standard & Poor’s introduced the S&P 500[®] Equal Weight Index on Jan. 8, 2003.

³ Velvadapu, Pradeep, “The Russell Equal Weight Indexes: An enhancement to equal weight methodology,” *Russell Research*, October 2010.

⁴ Russell Equal Weight Indexes include U.S. large cap, small cap and mid cap indexes, as well as global large cap, BRIC and Greater China indexes.

In this paper, we:

- Briefly examine the construction methodology of the Russell 1000[®] Equal Weight Index (R1EW), noting its approach to equal-weighting sectors first, and then equal-weighting the stocks within those sectors.
- Review the design of the Russell Equal Weight Indexes and how it helps alleviate potential capacity constraints.
- Review the historical performance of the R1EW relative to its parent Russell 1000[®] Index over the 10-year period July 2004 through June 2014.
- Examine the risk factor exposures and their contribution to the excess return for the R1EW over the past decade.
- Consider whether other potential return drivers might be responsible for the historical outperformance, and whether ex-ante factor exposures actually drive ex-post performance.

We find that, for the period studied, the underweight to the size factor only partially explains the observed outperformance.

Russell Equal Weight Index methodology overview

The Russell Equal Weight Indexes methodology⁵ improves on a naive equal-weighting approach in which all index constituents are simply assigned an equal weight. This simple approach can result in notable sector biases, since the weight of each sector is determined solely by the number of companies in the sector. For example, with a simple equal-weighted-constituent methodology, if the Technology sector has 100 stocks and the Health Care sector has 50, Technology's weight would be twice that of Health Care, regardless of the relative size of the companies within each of the two sectors.

Because the number of companies in a given sector alone is likely unrelated to the relative prospects of that sector versus others, simple equal-weighting will give more weight to some sectors than to others for reasons immaterial to expected returns. This results in sector concentration, which can increase risk due to sector-specific factors. In the spirit of agnostic views, equal-weighting the sectors will reduce that risk.

The Russell Equal Weight Indexes address this sector bias by equal-weighting sectors first, and then equal-weighting constituents within sectors. The series is rebalanced quarterly, with each sector in the underlying index allocated an equal weight (i.e., $1/S$, where S is the number of sectors in the parent index). Next, each constituent within each sector is assigned an equal weight within that sector (i.e., $1/N$, where N is the number of constituents within the sector). This approach has resulted in greater sector diversification and lower turnover over time.⁶

Capacity screen helps improve investability, with insignificant impact on returns

After equal weighting sectors and constituents in each quarterly rebalance, a capacity screen is applied, with capacity defined as the total amount that, theoretically, can be invested in each company.⁷ To be eligible for membership in the equal-weighted indexes, the share position of a potential constituent, in a notional portfolio of \$5 billion, cannot exceed 5% of the float-adjusted shares of a company. This screen has an insignificant impact on the excess returns of the index. In a simulation over the period 7/1/1996 to 6/30/2010, the Russell 1000 Equal Weight Index with a capacity screen applied had an annualized tracking error of only 33 basis points to the same index with no capacity screen applied.⁸ Since the Russell Equal

⁵ For additional information on the methodology of the Russell Equal Weight Indexes, see the Russell Global Indexes Construction and Methodology document available at russell.com/indexes.

⁶ Velvadapu (2010).

⁷ In Russell's market-cap-weighted indexes, capacity is determined by the float-adjusted shares of a company – the portion of total shares outstanding that are actually available for investment.

⁸ Velvadapu (2010).

Weight Indexes series is sector-equal-weighted, this screen produces no loss of sector exposure, and investability is improved.

Additional liquidity screen helps further improve liquidity

To address one of the main criticisms of equal-weighted indexes – that an equal-weighted index can require a sizable position in a smaller capitalization security, posing a liquidity risk – the Russell Sector Equal Weight Index methodology applies a screen prior to the construction of each index, which is designed to remove securities that could have difficulty assuming their required weight in the index. The liquidity screen removes securities that have a liquidity measure that is more than two standard deviations below the mean of a lognormal distribution of the average daily dollar trading value (ADDTV) of the securities in the Russell Global Large Cap Index. The cutoff point determined in this manner is used for all of the indexes in the Russell Equal Weight series (including U.S. and Global indexes).

For a security to be eligible for inclusion, it must have an average daily dollar trading value (ADDTV) greater than or equal to:

$$e^{\mu - 1.96\sigma}$$

Where: $x = \{x_1, x_2, \dots, x_i, x_n\}$ where x_i is the average daily dollar trading value of security i

$$\mu = \frac{\sum_{i=1}^n \ln(x_i)}{n}$$

$$\sigma = \sqrt{\frac{1}{N} \sum_{i=1}^n (\ln(x_i) - \mu)^2}$$

In the above equation, the mean and standard deviations are derived by use of the liquidity of the constituents in the Russell Global Large Cap Index. Small cap securities are subject to an ADDTV cutoff point that is half of the cutoff point identified above.⁹

At times, equal-weighted indexes have outperformed their cap-weighted parent indexes

In some historical periods, equal-weighted indexes have generated outperformance in the form of excess total return relative to their market-cap-weighted parent indexes. As shown in Figure 1, for example, the R1EW delivered annualized excess total return of 423 basis points relative to the Russell 1000[®] Index over the 10-year period July 2004 through June 2014.¹⁰

A simplistic explanation for this outperformance would look to the substantial underweighting of the very largest stocks. The figure includes the Russell Top 50[®] Mega Cap, Russell Top 200 and Russell MidCap indexes for comparison. Whereas as of June 30, 2014, the top 50 stocks comprise approximately 42% of the market value of the cap-weighted Russell 1000, they comprise only about 12% of the weight within the R1EW. The figure shows that those stocks have underperformed over this period; given the underweight of those stocks, the outperformance of the R1EW is no surprise. However, this underweight alone does not fully explain the outperformance shown in Figure 1.

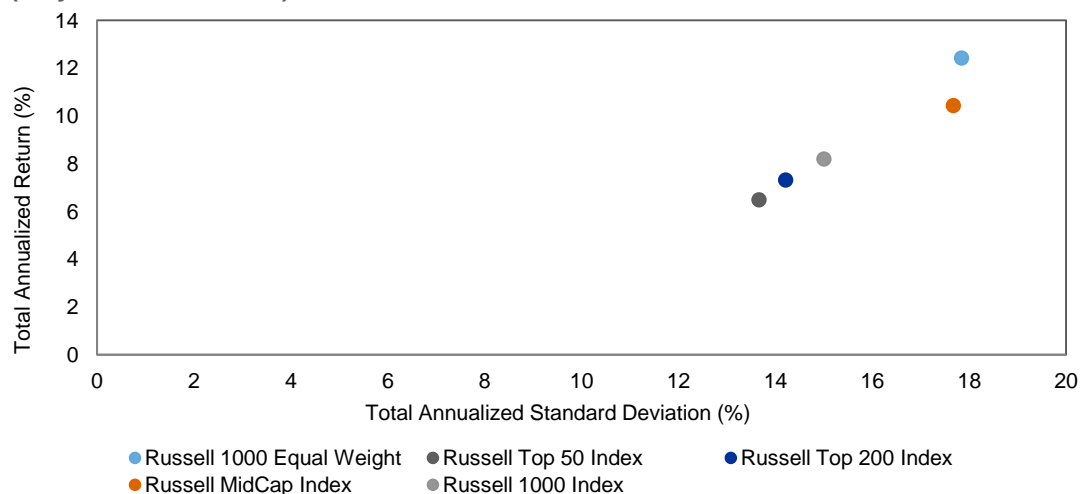
There is no free lunch, however, and that excess return did come with added risk in the form of a higher annualized standard deviation of returns. The higher risk was more than compensated for, however, with the equal-weighted index delivering higher risk-adjusted returns, as measured by Sharpe ratio, over the period, as shown in Table 1.

While the equal-weighted index delivered both more of the upside and more of the downside than the cap-weighted index, its up capture was appreciably higher than its down capture. Finally, the equal-weighted index had a tracking error of 5.13% and an information ratio of 0.70.

⁹ For further information about the Russell 2000 Equal Weight methodology, please see the Russell Global Indexes Construction and Methodology document available at russell.com/indexes.

¹⁰ All of the results in this paper are based on data from July 1, 2004 through June 30, 2014. The objective of this paper is not to definitively illustrate what the return drivers are for any period. The paper's sole purpose is to illustrate that for some time periods, the ex-ante drivers of performance may not be fully explanatory of the ex-post returns. An analysis of other time periods may yield different results.

Figure 1 / Equal weight index delivered higher return with higher risk (July 2004–June 2014)



Source: Russell Indexes, MPI Stylus, as of June 30, 2014.

Table 1 / Performance characteristics: Russell 1000 Equal Weight and Russell 1000 Indexes (July 2004–June 2014)

	Annualized Return (%)	Annualized Standard Deviation	Sharpe Ratio	Tracking Error (%)	Information Ratio	Up Capture (%)	Down Capture (%)
Russell 1000 Equal Weight	12.42	17.84	0.66	5.13	0.70	122.72	105.19
Russell 1000 Index	8.19	15.00	0.49	–	–	–	–

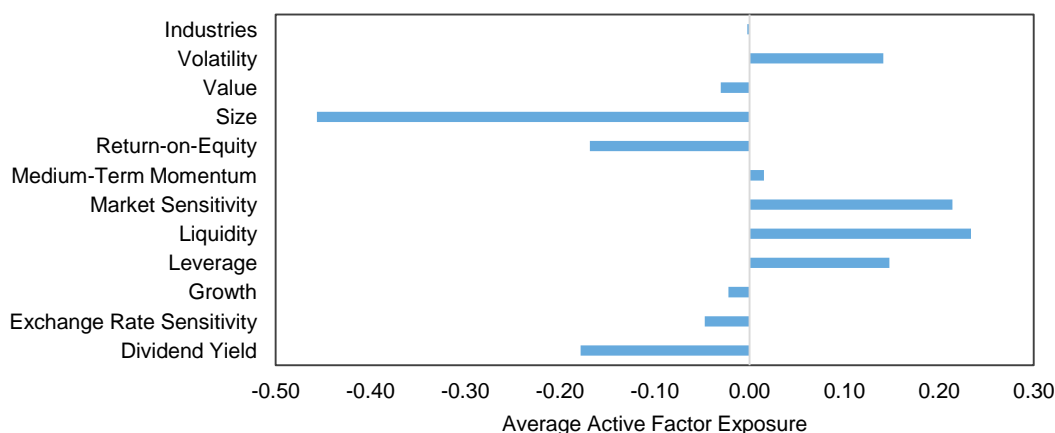
The Russell Equal Weight index had observable size and volatility factor weightings over the time period

Other instances of this type of historical outperformance by equal-weighted indexes have been well documented.¹¹ However, less clear is which factor exposures are the underlying drivers of this outperformance. To help answer this question, we investigated the ex-ante factor exposures of the R1EW relative to its parent Russell 1000 Index through the lens of the Axioma U.S. Equity Medium Horizon Fundamental Factor Risk Model.¹² The study period was for 10 years, from July 2004 through June 2014.

Figure 2 shows the average exposures to the fundamental factors of the risk model. Consistent with typical assumptions about equal-weighted indexes, our analysis showed that the equal-weighted index did indeed have a notable underexposure to the size factor – or a meaningful small/mid cap bias – relative to its cap-weighted parent index over our sample period. Because of this cap bias, the equal-weighted index had an overexposure to volatility and market sensitivity, or beta.

Other meaningful factor weightings included underexposures to return on equity and dividend yield and overexposures to liquidity and leverage.¹³ This makes sense, because the equal-weighted strategy tends to increase the weights of smaller, potentially less profitable businesses and decrease the weights of larger, more established companies that often pay larger dividends. Likewise, the smaller companies whose weights are increased in the equal-weighted index may have higher leverage.

Figure 2 / Average active factor weightings vs. Russell 1000 (July 2004–June 2014)



Sources: Russell Investments, FactSet, Axioma U.S. Equity Medium Horizon Fundamental Factor Risk Model

¹¹ Treynor, J. (2005), "Why Market-Valuation-Indifferent Indexing Works," *Financial Analysts Journal*, Vol. 61 (5), 65–69; Zeng, L., and F. Luo (2013), "10 Years Later: Where in the World is Equal Weight Indexing Now?" S&P research paper; Davidow, A. (2013), "Equal Weight ETFs: With the accelerating growth of index-based solutions, investors are asking 'is there a better beta?'" Guggenheim Investments.

¹² This Axioma risk model is used to measure the various relative risks of a portfolio, and attempts to estimate the future volatility of the portfolio based on its exposures to the risk factors as determined from holdings. Alternatively, a returns-based analysis along the lines of a Fama-French regression attempts to estimate the factor exposures and may yield different results. In principle, holdings-based analysis employs more information than returns-based, but estimates can be model-dependent. It certainly would be beneficial for an investor to use a variety of estimates from different models.

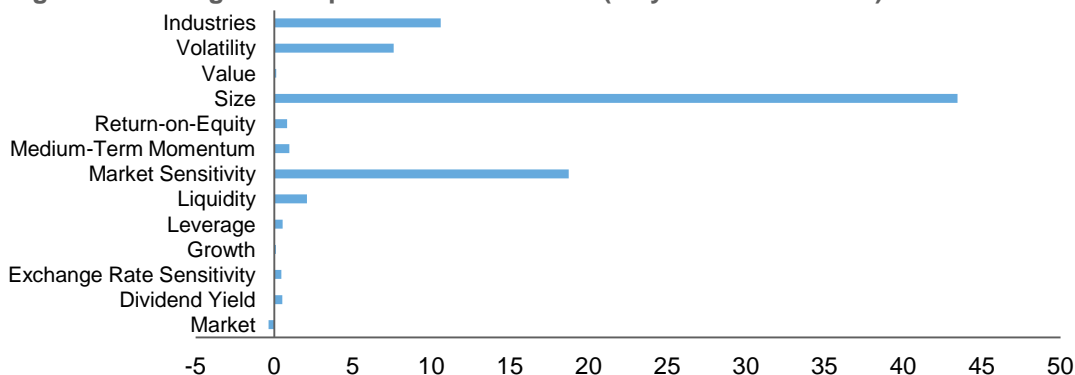
¹³ In the Axioma risk model, liquidity is a measure of a stock's trading activity, calculated as the 20-day average daily volume (expressed in currency units, not shares traded) divided by the 20-day average market capitalization. In this case, an overexposure to liquidity would indicate that the Russell 1000 Equal Weight Indexes held relatively more liquid stocks than did the Russell 1000.

Size and volatility/beta exposures do represent majority of active risk

The size, volatility and beta factor exposures accounted for the majority of the active risk, or forecasted variance, of the equal-weighted index relative to its cap-weighted parent index. We see this in Figure 3, which shows the percent of active risk contributed by each fundamental factor. The equal-weighted index's underexposure to the size factor accounted for more than 40% of its active risk. Overexposure to the market sensitivity and volatility factors combined represented over 25% of the equal-weighted index's active risk. Other factor exposures accounted for only minimal amounts of active risk.

Beyond style factors, another meaningful source of index return variance was industry exposures, which represented approximately 10% of active risk. (Below, we'll take a closer look at industry exposures and their contributions to return through the lens of standard Brinson-style sector attribution analysis.)

Figure 3 / Average factor percent of active risk (July 2004–June 2014)



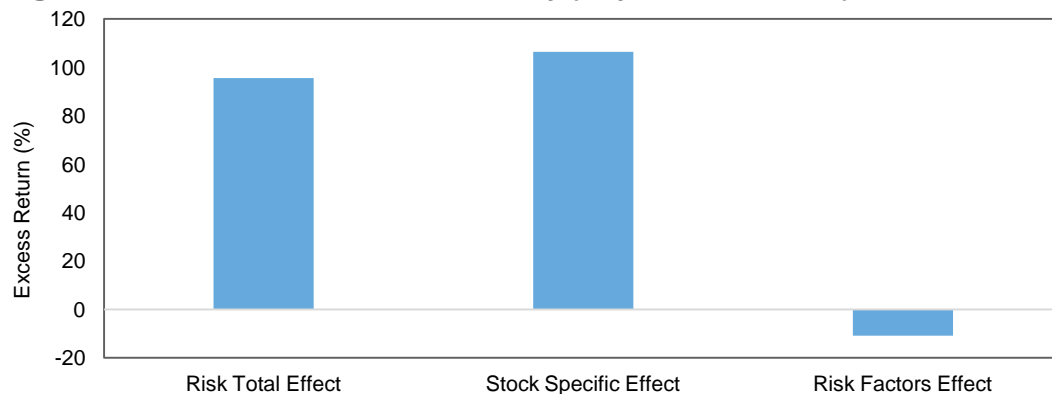
Sources: Russell Investments, Factset, Axioma U.S. Medium-Horizon Fundamental Factor Risk Model

But excess returns were explained more by stock-specific risks than by risk factor exposures

Given that the factor exposures of the equal-weighted index were consistent with our expectations, a natural question is whether the excess return that was measured can be attributed to those exposures.

An examination of a summary of the percentage contribution to return from various sources shows that style risk factors in aggregate represent only a small, negative contribution to the equal-weighted index's relative return, as illustrated in Figure 4. In fact, the majority of the contribution to relative return came from stock-specific risks, or the percentage of variance not explained by exposure to systematic risk factors.

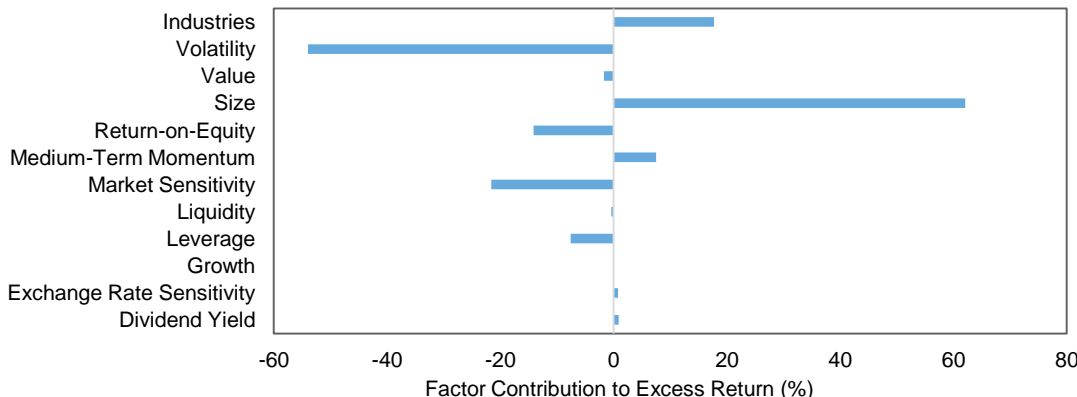
Figure 4 / Performance attribution summary (July 2004–June 2014)



Sources: Russell Investments, FactSet, Axioma U.S. Equity Medium Horizon Fundamental Factor Risk Model

How could the factor exposures in aggregate contribute so minimally to the excess return? Drilling down, Figure 5 shows contributions to return by individual risk factors. We see that the negative contribution to return due to the index's overexposure to the volatility and beta factors almost completely offset the positive contribution attributable to the small/mid cap exposure. Among other factors, industry exposure and medium-term momentum were positive contributors to relative return, while return on equity and leverage were negative contributors.

Figure 5 / Factor performance attribution (July 2004–June 2014)



Sources: Russell Investments, FactSet, Axioma U.S. Equity Medium Horizon Fundamental Factor Risk Model

Attribution analysis reveals influence on returns of sector weighting differences

In light of the finding that a large portion of excess return was attributable more to stock-specific risk than to fundamental factor risk, we studied the excess returns through a different lens, that of sector-based attribution.

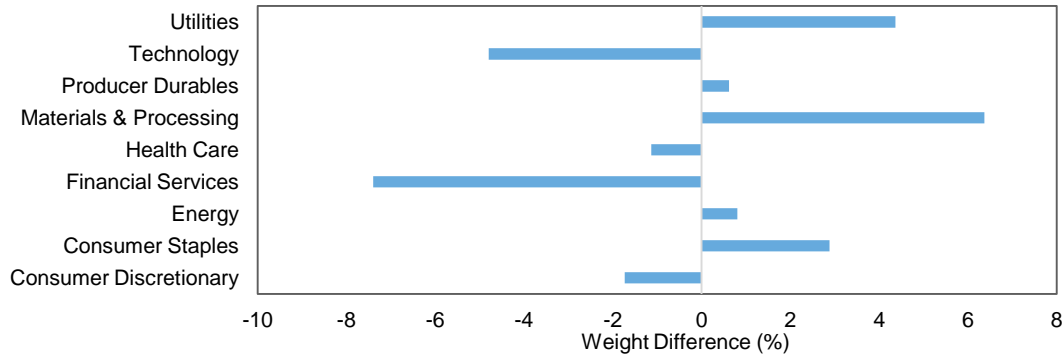
In the second phase of our research, we examined the relative returns of the R1EW vs. the Russell 1000 through standard Brinson-style sector attribution analysis.¹⁴ Here we found that, as expected, the equal-weighted index had meaningful differences in sector weightings relative to its parent over our 10-year sample period.

The largest sectors in the Russell 1000 are Financial Services and Technology, with weights of approximately 18% and 16%, respectively, as of June 30, 2014. Within the top 10 constituents are companies with very large market caps, such as Apple, Wells Fargo, Berkshire Hathaway and JPMorgan Chase. These types of large companies have a significantly smaller weighting within the equal-weighted index, resulting in significant underweights in these sectors relative to the Russell 1000, as illustrated in Figure 6.

By contrast, Materials & Processing and Utilities, with weightings of approximately 4% and 5%, respectively, are, as of June 30, 2014 the smallest sectors within the Russell 1000. Some of the smallest companies in the Russell 1000 are in these sectors, and they represent weightings of only about one basis point. Given their small weightings based on market cap, provided they have passed the liquidity screen, these companies tend to have higher weightings in the equal-weighted index relative to the Russell 1000. This can result in meaningful relative overweights to these sectors.

¹⁴ As compared with the factor-based analysis discussed above, a sector-based attribution is an ex-post analysis that focuses on sector weights as possible drivers of outperformance / underperformance. See Brinson, G., and N. Fachler (1985), "Measuring Non-U.S. Equity Portfolio Performance," *Journal of Portfolio Management*, Vol. 11 (3), pp. 73–76, and Brinson, G., L.R. Hood and G.L. Beebower (1986), "Determinants of Portfolio Performance," *Financial Analysts Journal*, Vol. 42 (4), pp. 39–44.

Figure 6 / Average sector weight differences (%) Russell 1000 Equal Weight vs. Russell 1000 (July 2004–June 2014)



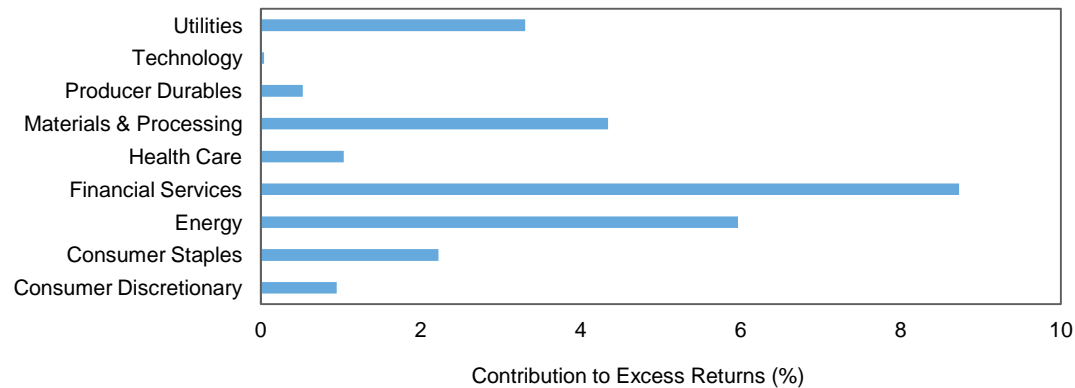
Source: Russell Investments, Factset

These sector differences were significant drivers of the equal-weighted index’s relative returns, as illustrated in Figure 7. The significant overweights to Materials & Processing and Utilities were both strong contributors to relative returns during our 10-year sample period. Likewise, the significant underweight to Financial Services also had significant, positive influence on relative returns during this period.

The Energy sector also stands out during this period, as it had a much smaller weighting difference but was the second-strongest positive contributor to relative returns. This points to another significant driver of relative returns beyond just the sector weighting differences at the overall sector level. As we illustrated earlier, and as the next section further highlights, stock-specific influences were the primary driver of relative return differences.

It is important to underscore that stock selection in this case is the result of a consistently applied, rules-based methodology that leads to over/underweights for securities within the equal-weighted index relative to its cap-weighted parent index, rather than the result of the type of analysis that an active investment manager would conduct to select stocks for their portfolio. However, the excess return produced by those over/underweights can be assessed similarly using ex-post attribution analysis.

Figure 7 / Standard Brinson Attribution (allocation effect) (July 2004–June 2014)



Source: Russell Investments, Factset

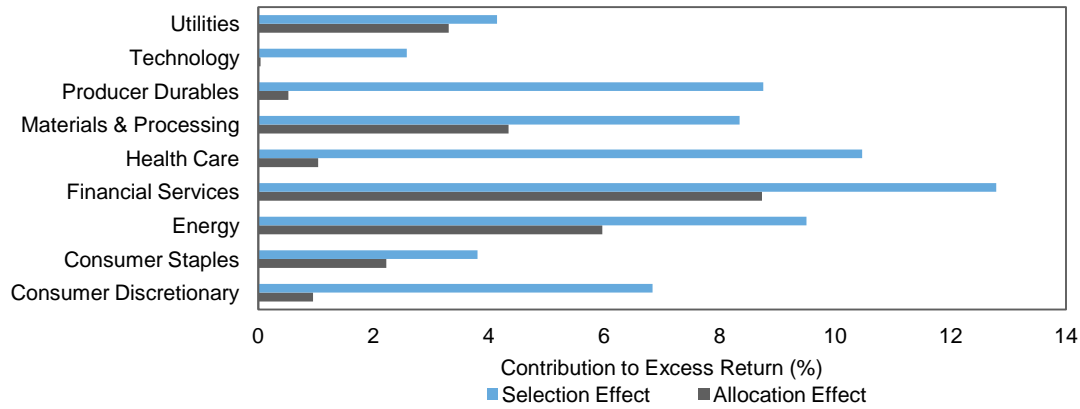
Figure 8 shows the stock-selection effects by sector, in addition to the sector-allocation effects.¹⁵ Stock selection within sectors was the primary driver of relative return differences between the equal-weighted index and the cap-weighted parent index over our sample period. In other words, which companies within each sector received overweights and underweights

¹⁵ This attribution is a “top-down” attribution, in which the interaction effect (the interaction between sector weighting and stock selection within sectors) is combined with the selection effect.

had an even greater influence on relative returns than did the overall sector weighting difference.

As the chart shows, the overall sector weighting differences did affect relative returns in every sector, with the strongest contribution coming from the Financial Services sector. However, in every sector, stock selection within the sector had the greatest influence on relative returns, with selection within Financial Services, Health Care and Energy among the strongest contributors. Some of the largest underweights were to mega cap companies in these sectors, which were positive contributors to the performance of the R1EW. Examples of these stocks include Citigroup, Medtronic and Exelon, whose performance during the time period underperformed the Russell 1000 parent index.

**Figure 8 / Standard Brinson Attribution (allocation and selection effects)
(July 2004–June 2014)**



Source: Russell Investments, Factset

Conclusion

Equal-weighted indexes, first introduced more than a decade ago, may be one of the earliest examples of a “smart beta index.” Their straightforward methodology has at times resulted in performance superior to that of their market-cap-weighted counterparts, albeit with an uptick in volatility.

However, with these attractive performance characteristics, a naive index methodology that equal-weights only the constituents can be accompanied by unappealing sector exposures. The Russell Equal Weight methodology, which equal-weights both sectors and constituents, has partially remediated these exposures. Similarly, by pre-screening index members to ensure that the index remains investable, the Russell methodology addresses concerns about liquidity.

Finally, we have seen that, for the 10-year time period we studied, an ex-ante analysis of the R1EW factor exposures exhibited the expected exposures to size, volatility and beta. However, ex-post performance attribution for that same time period demonstrated that the R1EW’s excess returns were driven primarily by sector-allocation and stock-selection effects, whereas the returns due to factor exposures were largely netted out.

Whether this outperformance will continue, we cannot say. However, our analysis does show that simple generalizations such as “the excess returns of equal-weight strategies are driven by exposure to the size factor” do not adequately explain the returns that have been observed. Further research should be undertaken to perform analysis over other time periods and other markets, in order to better understand explanatory drivers of returns.

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First use: November 2014. Revised January 2015.

CORP-9975-11-2016