# S&P Dow Jones Indices

A Division of S&P Global

**CONTRIBUTORS**

**Phillip Brzenk, CFA**
Director,
Global Research & Design
phillip.brzenk@spglobal.com

**Aye M. Soe, CFA**
Senior Director
Global Research & Design
aye.soe@spglobal.com

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# A Tale of Two Benchmarks: Five Years Later

Five years ago, S&P Dow Jones Indices published a research paper (Soe and Dash 2010) that examined the return differential between two of the leading U.S. small-cap benchmarks, the S&P SmallCap 600® and the Russell 2000®. The original paper attributed the main source of return differential to the inclusion of a profitability factor, leading to the S&P SmallCap 600 consistently outperforming the Russell 2000 on both an absolute and risk-adjusted basis. This paper aims to revisit this topic to see if the results have continued to hold true. In addition, it extends the original research by examining the effect that benchmark selection can have on performance measurement.

Indices play a multifaceted role in portfolio management. For passive investors, indices can underlie investment products, which provide exposure to an investment strategy in a given investment universe or market segment. For active investors, indices are used as benchmarks in order to compare the returns of an actively managed portfolio to that of an index representing the investment universe or style of the active portfolio. Benchmarks may also serve as proxies for asset class returns in formulating policy portfolios. Thus, a benchmark in a particular asset class or subclass serves not only as a point of comparison but also as a determinant in assessing the value of active management.

If benchmarks are assumed to represent a passive strategy in a given universe, then the risk/return profiles among various benchmarks in the same universe should be relatively similar in nature. This similarity appears to be borne out in the U.S. large-cap equity universe, as shown when comparing the returns of the Russell 1000® and the S&P 500®. Using monthly total returns from 1994 to 2014, Exhibit 1 charts the growth of a hypothetical investment of USD 1.00 in the S&P 500 and the Russell 1000, as well as in the S&P SmallCap 600 and the Russell 2000. In the U.S. large-cap universe, USD 1.00 invested in the S&P 500 and the Russell 1000 from January 1994 through December 2014 would have returned USD 6.63 and USD 6.80, respectively. However, in the small-cap universe, the returns of the Russell 2000 and the S&P SmallCap 600 are considerably different. An investment of USD 1.00 in the S&P SmallCap 600 over the same time period would have returned USD 8.59, while it would have returned USD 6.18 if invested in the Russell 2000.

**Exhibit 1: Cumulative Returns on Investments**
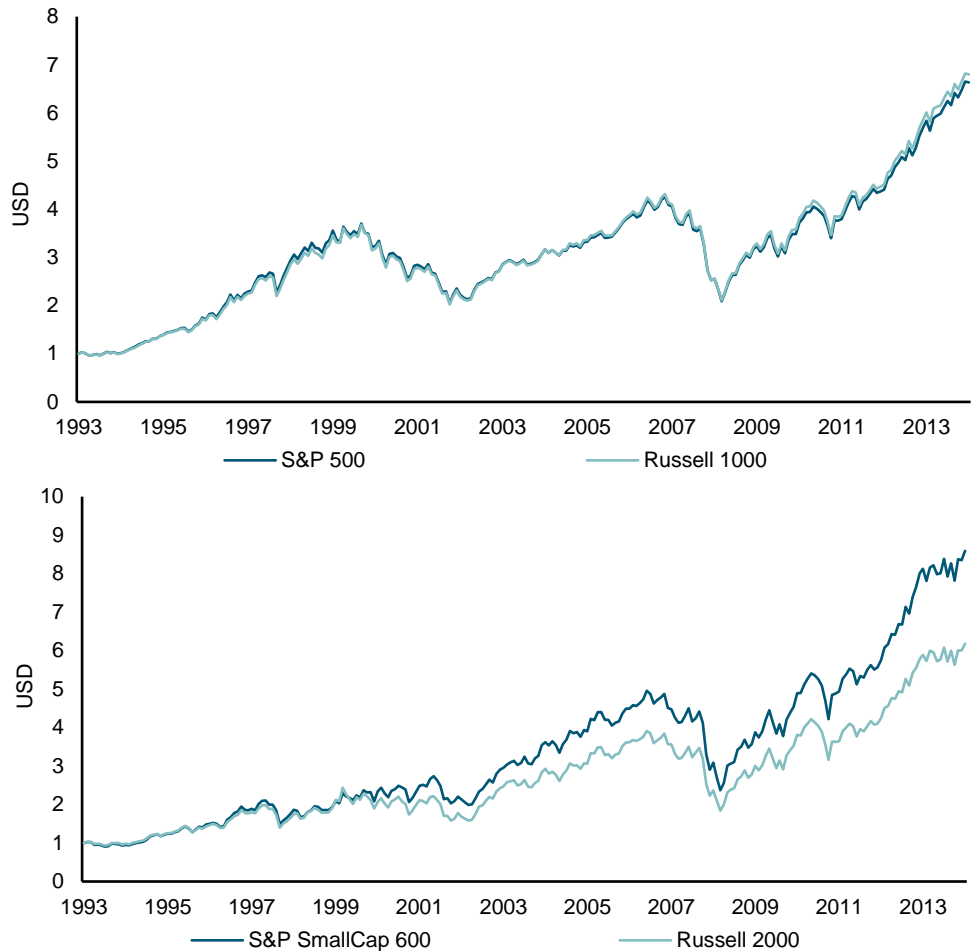


Benchmarks may also serve as proxies for asset class returns in formulating policy portfolios.

Source: S&P Dow Jones Indices LLC, Russell. Data from 1994 through 2014. Returns used are total returns in USD. It is not possible to invest directly in an index. Past performance is no guarantee of future results. Charts and tables are provided for illustrative purposes and may reflect hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

Since its launch in 1994, the S&P SmallCap 600 has outperformed the Russell 2000 in 14 of 21 calendar years. From January 1994 through December 2014, the returns of the S&P SmallCap 600 exceeded those of the Russell 2000 by 1.72% on an annualized basis. It is also important to note that the S&P SmallCap 600 has exhibited lower volatility than the Russell 2000 historically, leading to a higher Sharpe Ratio. These results are similar to what was seen in the previous research paper on this topic (2%), when the time range reviewed was from 1994 to 2009. Exhibit 2 highlights the risk/return profiles of the two indices.

| Exhibit 2: Risk/Return Profiles | | |
|---|---|---|
| **Annualized Return (%)** | **S&P SmallCap 600** | **Russell 2000** |
| 1-Year | 5.76 | 4.89 |
| 3-Year | 20.24 | 19.21 |
| 5-Year | 17.27 | 15.55 |
| 10-Year | 9.02 | 7.77 |
| 20-Year | 11.63 | 9.63 |
| Since Inception | 10.78 | 9.06 |
| **Annualized Volatility (%)** | | |
| 3-Year | 12.53 | 13.31 |
| 5-Year | 16.92 | 17.98 |
| 10-Year | 19.10 | 19.75 |
| 20-Year | 18.84 | 19.81 |
| Since Inception | 18.61 | 19.48 |
| **Sharpe Ratio** | | |
| 3-Year | 1.61 | 1.44 |
| 5-Year | 1.02 | 0.86 |
| 10-Year | 0.39 | 0.31 |
| 20-Year | 0.47 | 0.34 |
| Since Inception | 0.42 | 0.32 |

Source: S&P Dow Jones Indices LLC, Russell, FactSet. Data from 1994 through 2014. Past performance is no guarantee of future results. Charts and tables are provided for illustrative purposes and may reflect hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

If benchmarks are assumed to represent a passive strategy in a given universe, then the risk/return profiles among various benchmarks in the same universe should be relatively similar in nature.

The continued return differential between the two small-cap indices merits further study, and an understanding of the factors contributing to the divergence.

## A REVIEW OF INDEX METHODOLOGY

While both the Russell 2000 and the S&P SmallCap 600 measure returns on a U.S. small-cap, passive investment strategy, the construction of the two indices differs considerably.

As the name implies, the Russell 2000 represents 2,000 small-cap U.S. companies based on their market capitalization, and the index is reconstituted annually at the end of June. Securities are ranked according to their total market capitalization as of the last trading day of May, and those with rankings of 1,001 to 3,000 are included in the Russell 2000.

In contrast, the S&P SmallCap 600 implements constituent changes on an as-needed basis. To be eligible for inclusion, companies must meet market capitalization, liquidity, public float, GICS® sector representation, and profitability measures. Constituent deletions may occur due to bankruptcy, mergers, acquisitions, significant restructuring, or substantial violations of one or more of the eligibility measures. Since S&P Dow Jones Indices

does not follow a purely mechanical approach, additions and deletions are less predictable.  Exhibit 3 highlights the methodology differences between the two indices.

**Exhibit 3: Index Construction Differences**

| INCLUSION CRITERIA | S&P SMALLCAP 600 | RUSSELL 2000 |
|---|---|---|
| Financial Viability | The sum of the most recent four consecutive quarters' as-reported earnings should be positive, as should the most recent quarter[1] | None |
| Liquidity | Requires annual trading turnover of at least 30% of shares outstanding | None |
| Public Float | At least 50% of shares publicly floated | Only 5% of shares publicly floated |
| Reconstitution of Stocks | Throughout the year, as corporate actions arise | Only once a year, except for IPOs |
| IPO Seasoning | Six to twelve months required | None |
| Domicile of Constituents | U.S. companies, based on multiple criteria such as fixed assets, revenues, listing, etc. | U.S. companies, based on criteria such as fixed assets, revenues, listing, etc. |
| Sector Classification | Global Industry Classification Standard (GICS) | Proprietary sector classification framework |

Source:  S&P Dow Jones Indices LLC, Russell.  Charts and tables are provided for illustrative purposes only.

## IMPACT OF RECONSTITUTION

Numerous studies have been conducted on Russell's annual reconstitution process in June, particularly regarding the downward price pressure exerted by the reconstitution.  As winners from the Russell 2000 graduate to the Russell 1000, and losers from the Russell 1000 move down to the small-cap index, fund managers are forced to sell winners and buy losers, thereby creating a negative momentum portfolio (Furey 2001).  Jankovskis (2002) and Chen, Noronha, and Singal (2006) estimated that the predictable nature of the June Russell rebalancing process biases the return of the index downward by an average of approximately 2% per year.  Similarly, Chen, Noronha, and Singal (2006) found the rebalancing impact to be 1.3% per year.

Our analysis of the monthly excess returns of the S&P SmallCap 600 versus the Russell 2000 reveals a similar finding.  The analysis examined the average excess returns from January 1994 through December 2014, which are grouped by calendar month (see Exhibits 4 and 5).  The monthly excess returns of the S&P SmallCap 600 versus the Russell 2000 for July are higher than any other month, and this is found to be statistically significant with a t-stat of 2.54.  It should be noted that based on the t-statistic for each calendar month, July is the only calendar month to have a statistically significant t-stat.  The results indicate that there may be a strong relationship between the Russell 2000 annual rebalancing in June and the

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[1]  Prior to 2014, S&P Dow Jones Indices' financial viability criteria required four consecutive quarters of positive earnings, instead of the sum of the last four quarters being positive.

negative excess returns in the following month, when compared with the S&P SmallCap 600.

**Exhibit 4: Average Monthly Excess Return: S&P SmallCap 600 Versus the Russell 2000**
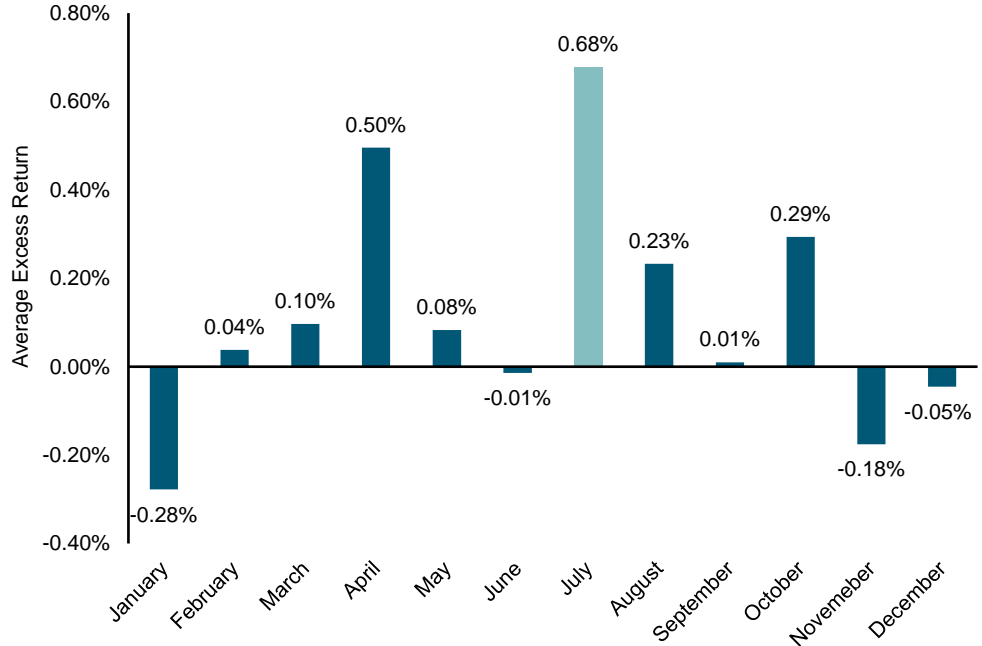


Source: S&P Dow Jones Indices LLC, Russell.  Data from 1994 through 2014.  Past performance is no guarantee of future results.  Charts and tables are provided for illustrative purposes and may reflect hypothetical historical performance.  Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

| **Exhibit 5: T-Stat of Average Monthly Excess Return** | | | |
|---|---|---|---|
| **MONTH** | **T-STAT** | **MONTH** | **T-STAT** |
| January | -1.08 | July | 2.54 |
| February | 0.18 | August | 1.51 |
| March | 0.49 | September | 0.06 |
| April | 1.71 | October | 1.07 |
| May | 0.36 | November | -0.80 |
| June | -0.08 | December | -0.16 |

Source: S&P Dow Jones Indices LLC, Russell.  Data from 1994 through 2014.  Past performance is no guarantee of future results.  Charts and tables are provided for illustrative purposes and may reflect hypothetical historical performance.  Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

Exhibit 6 examines the indices' returns by calendar year.  As the last column indicates, the distribution of relative outperformance is spread throughout the year.  This distribution suggests that the July effect alone may not account for all of the S&P SmallCap 600's excess return.  In addition, Russell has made enhancements to its rebalancing process in order to lessen its impact.  For example, eligible initial public offerings (IPOs) began to be added on a quarterly basis in 2004 and market capitalization buffers were introduced at the 2007 reconstitution.

**Exhibit 6: Calendar Year Returns**

| YEAR | S&P SMALLCAP 600 (%) | RUSSELL 2000 (%) | EXCESS RETURN (%) | # OF MONTHS S&P SMALLCAP 600 > RUSSELL 2000 |
|---|---|---|---|---|
| 1994 | -4.77 | -1.82 | -2.95 | 4 |
| 1995 | 29.96 | 28.45 | 1.51 | 6 |
| 1996 | 21.32 | 16.49 | 4.83 | 10 |
| 1997 | 25.58 | 22.36 | 3.22 | 8 |
| 1998 | -1.31 | -2.55 | 1.24 | 9 |
| 1999 | 12.40 | 21.26 | -8.85 | 4 |
| 2000 | 11.80 | -3.02 | 14.82 | 8 |
| 2001 | 6.54 | 2.49 | 4.05 | 6 |
| 2002 | -14.63 | -20.48 | 5.85 | 8 |
| 2003 | 38.79 | 47.25 | -8.46 | 4 |
| 2004 | 22.65 | 18.33 | 4.32 | 6 |
| 2005 | 7.68 | 4.55 | 3.13 | 7 |
| 2006 | 15.12 | 18.37 | -3.25 | 5 |
| 2007 | -0.30 | -1.57 | 1.27 | 6 |
| 2008 | -31.07 | -33.79 | 2.71 | 8 |
| 2009 | 25.57 | 27.17 | -1.60 | 5 |
| 2010 | 26.31 | 26.85 | -0.55 | 6 |
| 2011 | 1.02 | -4.18 | 5.19 | 9 |
| 2012 | 16.33 | 16.35 | -0.02 | 7 |
| 2013 | 41.31 | 38.82 | 2.49 | 7 |
| 2014 | 5.76 | 4.89 | 0.86 | 6 |
| Average | 10.78 | 9.06 | 1.72 | - |

Source: S&P Dow Jones Indices LLC, Russell. Data from 1994 through 2014. Past performance is no guarantee of future results. Charts and tables are provided for illustrative purposes and may reflect hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

Eligible initial public offerings (IPOs) began to be added on a quarterly basis in 2004 and market capitalization buffers were introduced at the 2007 reconstitution.

To further segregate the relative performance while controlling for the July reconstitution effect, a hypothetical Russell 2000 index was created, where the monthly returns for July are represented by the S&P SmallCap 600's returns. Therefore, the remaining return differential between the S&P SmallCap 600 and the hypothetical Russell 2000 would represent effects other than the reconstitution effect. Exhibit 7 shows the growth of a USD 1.00 investment in the S&P SmallCap 600, the Russell 2000, and the hypothetical Russell 2000.

**Exhibit 7: Controlling for the Reconstitution Effect**
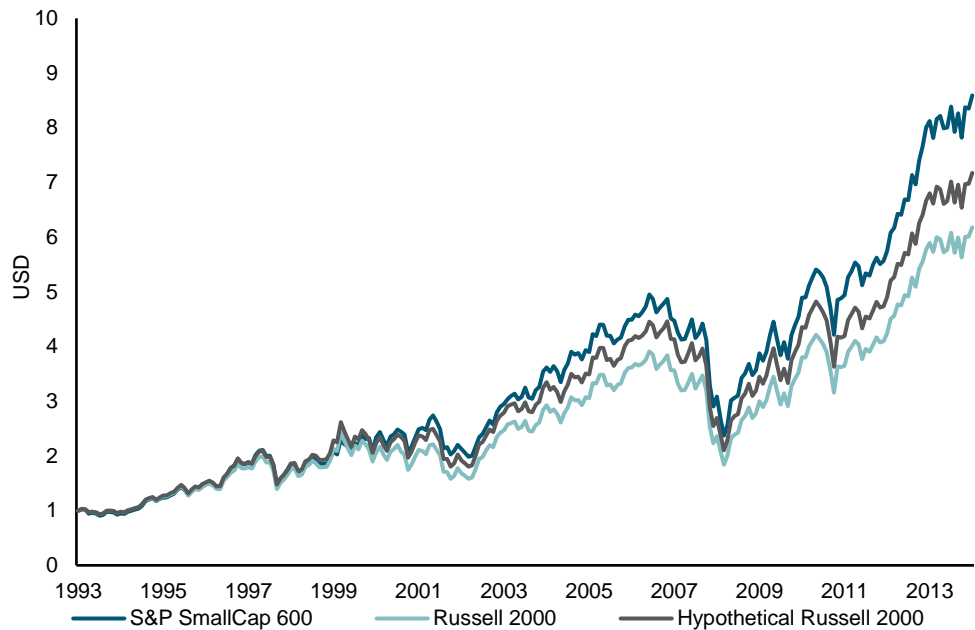


Source: S&P Dow Jones Indices LLC, Russell. Data from 1994 through 2014. Past performance is no guarantee of future results. Charts and tables are provided for illustrative purposes and may reflect hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance. The hypothetical Russell 2000 was constructed by replacing the month of July returns of the Russell 2000 with those of the S&P SmallCap 600.

*Only a portion of the excess returns may be attributed to the July reconstitution effect, with the rest of the difference coming from factors other than the annual reconstitution.*

From January 1994 through December 2014, an investment of USD 1.00 in the Russell 2000 and the hypothetical Russell 2000 would have yielded USD 6.18 and USD 7.17, respectively, while the same investment in the S&P SmallCap 600 would have returned USD 8.59.

The difference between the Russell 2000 and the S&P SmallCap 600 amounts to USD 2.41, while the difference between the hypothetical Russell 2000 and the S&P SmallCap 600 is USD 1.42. Therefore, only a portion of the excess returns may be attributed to the July reconstitution effect, with the rest of the difference coming from factors other than the annual reconstitution.

## FACTOR DECOMPOSITION

To further dissect the differences between the two indices, we employ the four-factor regression model introduced by Carhart (1997), which combines the traditional factors from the Fama-French Three Factor model (Fama and French 1993) with a momentum factor. In the model, portfolio returns are explained using their exposures to four factors: sensitivity to the market (beta), size of the stocks in the portfolio (size), average weighted book-to-market (value), and price change (momentum).

The risk premium for each factor is defined as follows:[2]

1. Equity Risk Premium: Represented by (RM – RF), which is the return on a market value-weighted equity index minus the return on the one-month U.S. Treasury Bill.  It measures systematic risk.
2. Size Premium: Represented by Small Minus Big (SMB), which measures the additional return from investing in small stocks.  The SMB factor is computed as the average return on three small-cap portfolios minus the average return on three large-cap portfolios.
3. Value Premium: Represented by High Minus Low (HML), which measures additional return from investing in value stocks, as measured by high book-to-market ratios.  It is calculated as the average return on two high book-to-market portfolios minus the average return on two low book-to-market portfolios.
4. Momentum Premium: Represented by Winners Minus Losers (WML), which measures the additional return from investing in momentum stocks, as measured by the prior price return.  The factor is calculated as the average return on two high prior price return portfolios minus the average return on two low prior price return portfolios.

The estimate of the required return on an asset is:

$$R_i = R_F + \beta_{market}(R_M - R_F) + \beta_{size}(SMB) + \beta_{value}(HML) + \beta_{momentum}(WML)$$
**(1)**

The coefficient for each factor, β, measures the sensitivity of the asset's return to the factor.

The sampling period in the regression analysis is from January 1994 to December 2014, which is inclusive of all available history of the S&P SmallCap 600 (Russell 2000 return streams go back to 1978).  The historical monthly returns of the Russell 2000 and the S&P SmallCap 600 are regressed against the historical values of (1) the excess return on the market (RM – RF), (2) the performance of small stocks relative to large stocks (SMB), (3) the performance of value stocks relative to growth stocks (HML), and (4) the performance of winners minus losers (WML).

The regression results are shown in Exhibit 8.  The table shows that the S&P SmallCap 600 and the Russell 2000 have similar exposure to the market factor.  With regard to the size premium, the Russell 2000 has a slightly higher SMB coefficient than the S&P SmallCap 600, suggesting that the Russell 2000 has a higher exposure to small-cap stocks.  This is to be expected, as the smallest 1,000 securities of the Russell 2000 are also part of the Russell Microcap® Index.  The S&P SmallCap 600's higher HML

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coefficient implies that the index has a higher exposure to the value factor. The presence of a higher value premium may support the view that the S&P SmallCap 600 has a stronger tilt toward value due to its requirement that securities have four consecutive quarters of positive earnings. The momentum factor fails to assist in explaining returns in the benchmarks, with both coefficients being statistically insignificant.

**Exhibit 8: Four-Factor Regression Results (1994 through 2014)**

| FACTOR | S&P SMALLCAP 600 | | | RUSSELL 2000 | | |
|---|---|---|---|---|---|---|
| | COEFFICIENT | STDER | T-STAT | COEFFICIENT | STDER | T-STAT |
| Intercept | 0.176 | 0.088 | 1.986 | 0.044 | 0.059 | 0.747 |
| Market (RM – RF) | 0.983 | 0.021 | 45.776 | 1.013 | 0.014 | 70.674 |
| Size (SMB) | 0.702 | 0.028 | 25.513 | 0.788 | 0.018 | 42.919 |
| Value (HML) | 0.355 | 0.030 | 12.030 | 0.265 | 0.020 | 13.480 |
| Momentum (WML) | 0.010 | 0.018 | 0.567 | 0.007 | 0.012 | 0.548 |
| Adjusted $R^2$ | 0.968 | - | - | 0.987 | - | - |

Source: S&P Dow Jones Indices LLC, Russell, Ken French for the factor data. Data from 1994 through 2014. Past performance is no guarantee of future results. Charts and tables are provided for illustrative purposes and may reflect hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance. Calculations by S&P Dow Jones Indices.

Previous research by S&P Dow Jones Indices (Soe and Dash 2010) found that the use of a profitability screen, specifically four consecutive quarters of positive earnings, has been shown to play a significant role in the return differential of the two small-cap indices. A number of studies on U.S. small-cap indices have had similar findings using varying definitions of profitability. Ascioglu and Mcdermott (2014) use the gross profitability margin—defined as gross profits scaled by assets—and found the S&P SmallCap 600 to have positive exposure to the factor, while the Russell 2000 had negative exposure. Asness, Frazzini, and Pedersen (2013) defined quality as companies that are safe, profitable, growing, and well managed. These authors showed that a Quality Minus Junk (QMJ) factor has positive excess returns within the U.S. small-cap stock[3] universe with the t-stat statistically significant at a 95% confidence interval (t-stat of 2.7).

To investigate if quality is a driver in the returns of the small-cap indices, we substitute the quality-minus-junk (QMJ) factor, as introduced by Asness, et al (2013), for momentum in the regression analysis.

The new estimate of the required return on an asset with the inclusion of quality is:

$$R_i = R_F + \beta_{market}(R_M - R_F) + \beta_{size}(SMB) + \beta_{value}(HML) + \beta_{quality}(QMJ)$$
**(2)**

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[3] The authors formed two size-sorted portfolios based on their market capitalizations. The median NYSE market equity serves a size break point between the two.

The Quality Premium, represented by QMJ (Quality Minus Junk), measures the additional return from investing in quality stocks. The factor is calculated as the average return on two high-quality portfolios minus the average return on two low-quality portfolios.

Using the same sampling period as the previous four-factor regression, Exhibit 9 displays the quality regression results. The results show that while the explanatory power (adjusted $R^2$) of the quality factor model increases minimally, we see that several of the individual factor return coefficients change considerably. At 95% confidence interval, the quality factor is statistically significant in explaining returns in the S&P SmallCap 600 (t-stat of 6.634), but the same is not seen in the Russell 2000 (t-stat of 1.868).

In the first four-factor model, the size factor was lower in the S&P SmallCap 600 versus the Russell 2000, but in the new model, the size factor for the S&P SmallCap 600 increases marginally to 0.805 from 0.702, which is almost equivalent to the Russell 2000 size factor. Thus, the quality factor erases the previously perceived size difference between the two indices. Also, the inclusion of quality increases the market factor of the S&P SmallCap 600 to be higher than the Russell 2000, making the S&P SmallCap 600 marginally more reactionary to market changes than the Russell 2000. In addition, quality changes the S&P SmallCap 600's unexplained alpha to -.034 from +0.174 and the Russell 2000's alpha to +0.005 from +0.044, with both alpha t-stats being insignificant. With the previously unexplained alphas being explained away, the conclusion is that the quality four-factor model is a powerful tool in returns analysis.

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**Exhibit 9: Four-Factor Regression Results (1994 through 2014)**

| FACTOR | S&P SMALLCAP 600 | | | RUSSELL 2000 | | |
|---|---|---|---|---|---|---|
| | COEFFICIENT | STDER | T-STAT | COEFFICIENT | STDER | T-STAT |
| Intercept | -0.034 | 0.087 | -0.394 | 0.005 | 0.063 | 0.078 |
| Market (RM – RF) | 1.092 | 0.025 | 43.154 | 1.033 | 0.018 | 56.752 |
| Size (SMB) | 0.805 | 0.029 | 27.300 | 0.810 | 0.021 | 38.198 |
| Value (HML) | 0.369 | 0.027 | 13.755 | 0.267 | 0.019 | 13.835 |
| Quality (QMJ) | 0.278 | 0.042 | 6.634 | 0.056 | 0.030 | 1.868 |
| Adjusted $R^2$ | 0.973 | - | - | 0.987 | - | - |

Source: S&P Dow Jones Indices LLC, Ken French for the four-factor data, AQR for Quality factor data. Data from 1994 through 2014. Past performance is no guarantee of future results. Charts and tables are provided for illustrative purposes and may reflect hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

With quality now revealed as a statistically significant factor in explaining returns of the S&P SmallCap 600, we wanted to test whether a profitability factor contributes to excess return. A factor model was created to see whether a profitability criteria imposed on a market-capitalization-weighted index can add alpha in the long run. To conduct the study, a universe of

U.S. small-cap stocks with a market capitalization between USD 200 million and USD 2 billion was divided into the following two groups.

- Group 1 consisted of securities that have at least four consecutive quarters of positive trailing EPS.
- Group 2 consisted of securities that do not have four consecutive quarters of positive trailing EPS.

The stock-hit-rate ratio is a time-series average of the number of securities within a group that have outperformed the overall benchmark return for a single day.

The testing period ran from January 1994 through December 2014, with the holding period assumption being 12-month portfolios weighted by market capitalization. To avoid survivorship bias, the Compustat Research Inactive database was used to ensure that all currently inactive companies were included in the test universe. To minimize the look-ahead bias, the Charter Oak Compustat non-restated fundamental data with a one-quarter lag was used. The results are illustrated in Exhibit 10.

| Exhibit 10: Impact of the Positive Earnings Screen on Performance (1994 through 2014) | | | | | | |
|---|---|---|---|---|---|---|
| GROUP | RETURNS | SHARPE RATIO | INFORMATION RATIO | T-STAT ALPHA | STOCK HIT RATE | BETA |
| Group 1 | 12.48 | 0.48 | 0.29 | 12.20 | 47.95 | 0.83 |
| Group 2 | 7.90 | 0.07 | -0.36 | -11.57 | 40.83 | 1.24 |
| Universe | 10.64 | 0.29 | - | - | 44.99 | 1 |

Source: Compustat, FactSet. Data from 1994 through 2014. Past performance is no guarantee of future results. Charts and tables are provided for illustrative purposes and may reflect hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

Group 2 underperformed the universe, while Group 1 outperformed it, with the t-stats showing the significance of the returns at a 95% confidence interval. The results confirm that securities with at least four trailing quarters of positive EPS outperformed those without positive EPS history. The stock-hit-rate ratio is a time-series average of the number of securities within a group that have outperformed the overall benchmark return for a single day. In our analysis of the small-cap universe, 44.99% of the randomly selected stocks outperformed the overall universe during the in-sample test period, on average. Securities in Group 2 only outperformed the universe 40.83% of the time, while securities in Group 1 achieved a stock hit rate of 47.95%, further proving that the profitability factor can provide value.

On a risk-adjusted basis, the performance of Group 1 is superior to that of Group 2. The profitability criteria also results in the beta of Group 1 being lower than the average market beta. In contrast, Group 2 has higher average market beta.

These results confirm that the S&P SmallCap 600's profitability requirement may play an integral role in the excess returns of the S&P SmallCap 600 over the Russell 2000.

## IMPACT OF BENCHMARK SELECTION

The aforementioned analysis has shown that the differing historical risk/return profile of the two benchmarks, which represent the same U.S. small-cap market segment, can be at least partially explained by the July reconstitution effect and the additional screening criteria set in place for the S&P SmallCap 600. The substantial divergence in returns between the two indices highlights that investors should be aware of index construction differences, which can have a meaningful impact the returns of those indices. Both indices are representing a particular market segment which, in turn, poses practical considerations for both passive and active investors who employ index returns as a key decision input in the investment process.

For those who are tasked with evaluating managers, varying returns can lead to contradictory conclusions about the ability of a manager to add value, depending on which benchmark is used. In that light, our focus now shifts to the impact of benchmark selection in the performance measurement process. In particular, we seek to understand the extent to which benchmarking against a particular index improves a manager's odds of outperforming. Philips (2011) demonstrated that within the same universe of active managers, using a different benchmark can mean the difference between an outperforming manager and an underperforming manager.

In order to determine the effect that selecting one of the small-cap indices can have on manager appraisal, we compared a universe of actively managed small-cap funds against the two benchmarks. The returns comparisons used were computed using the University of Chicago's Center for Research Security Prices (CRSP) Survivorship-Bias Free U.S. Mutual Fund database. Consistent with the widely cited SPIVA® Scorecard's methodology, we removed the index funds, leveraged and inverse funds, and other index-linked products from the universe. In addition, when a given fund included multiple share classes in the initial universe, the returns of the share class with the greatest assets were taken into consideration to avoid double counting.

Exhibits 11 and 12 show the percentage of funds underperforming each benchmark, based on rolling three-year and five-year returns, respectively, on a semiannual basis from 2005 through 2014. The percentage of funds underperforming each benchmark varies considerably throughout the sample period. Based on rolling three-year annualized returns, the S&P SmallCap 600 consistently outperforms the Russell 2000 (there is only one three-year holding period return where the S&P SmallCap 600 underperforms the Russell 2000). As a result, more actively managed small-cap funds underperform the S&P SmallCap 600 than the Russell 2000. Based on three-year annualized returns, 73% of funds underperform

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the S&P SmallCap 600 on average, while roughly 60% underperform the Russell 2000. Results are similar using five-year annualized returns, where approximately 73% underperform the S&P SmallCap 600 and 59% underperform the Russell 2000. In both cases, the majority of active managers in the Lipper Small-Cap Core Fund universe underperform both benchmarks. However, there is a significant difference in the percentage of funds underperforming the S&P SmallCap 600 versus the Russell 2000, as a higher percentage of managers underperform the former. The difference is represented by the black line in the two exhibits. The average difference in funds underperforming the benchmarks is 13.06% and 13.96% for the three-year and five-year holding period returns, respectively. The difference is found to be statistically significant at the 95% confidence level (three-year t-stat of 7.06, five-year t-stat of 7.05).

**Exhibit 11: Percentage of Funds Underperforming the Benchmark Based on Three-Year Annualized Returns**
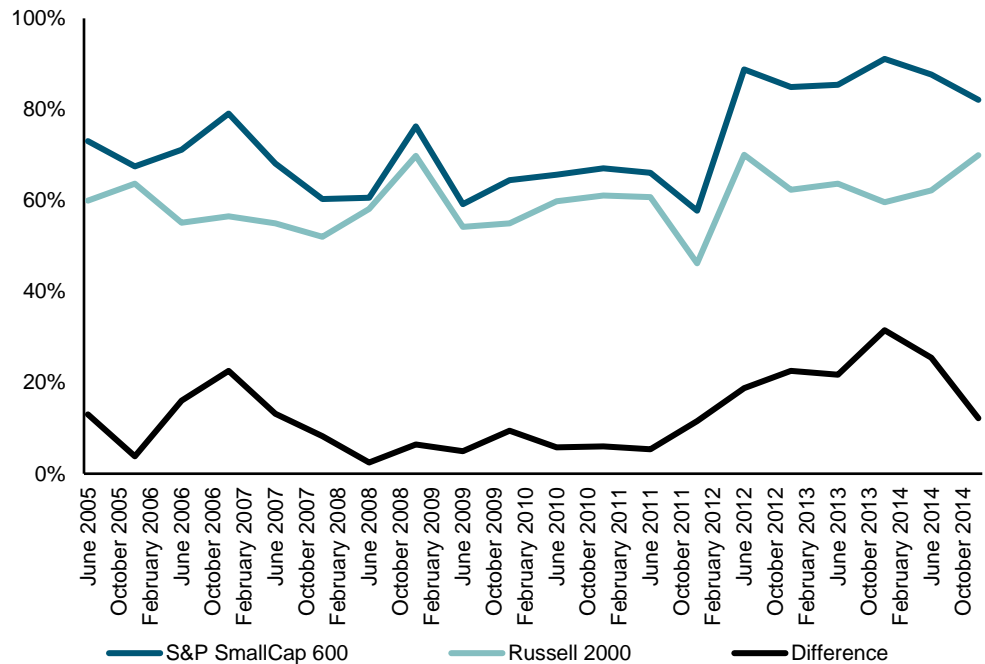


Source: S&P Dow Jones Indices LLC, Russell, CRSP. Data from June 2005 through December 2014. Past performance is no guarantee of future results. Charts and tables are provided for illustrative purposes and may reflect hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance. It is not possible to invest directly in an index, and index returns do not reflect expenses of investing in securities or other assets.

**Exhibit 12: Percentage of Funds Underperforming the Benchmark Based on Five-Year Annualized Returns**
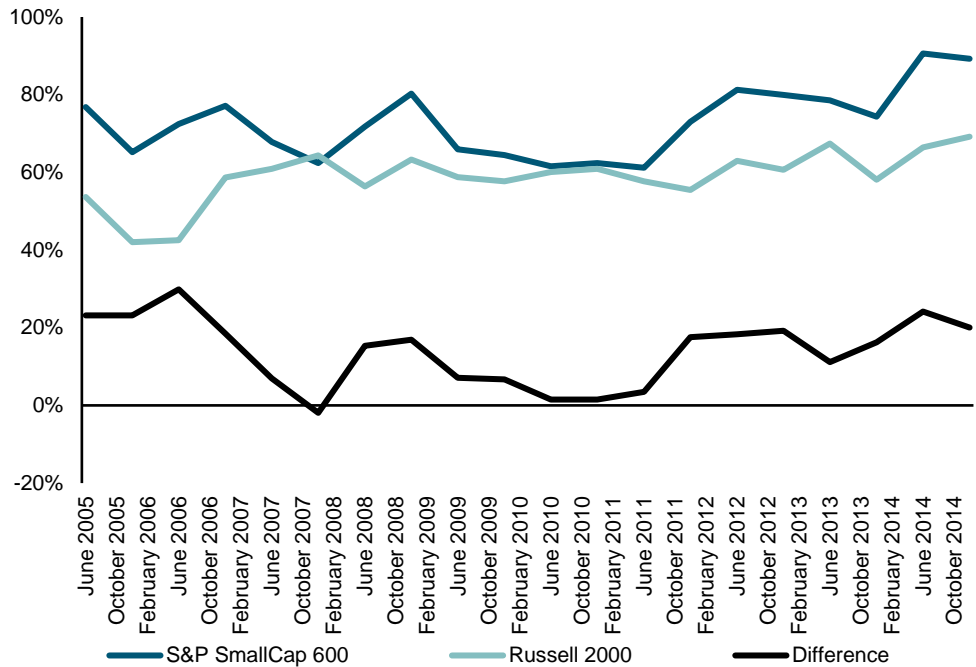


Source: S&P Dow Jones Indices LLC, Russell, CRSP. Data from June 2005 through December 2014. Past performance is no guarantee of future results. It is not possible to invest directly in an index, and index returns do not reflect expenses of investing in securities or other assets. Charts and tables are provided for illustrative purposes and may reflect hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

If different benchmarks measuring the same asset class can yield different realized returns, the ability to differentiate a skilled manager from an unskilled one can be an arduous process.

These results highlight the difficulty investors sometimes face in measuring the precise value offered by active managers. If different benchmarks measuring the same asset class can yield different realized returns, the ability to differentiate a skilled manager from an unskilled one can be an arduous process. In that light, we propose using the Information Ratio (IR), defined as the active return divided by active risk, to measure the effectiveness of a manager's investment insight, irrespective of the benchmark against which he or she is being measured.

In this section, we calculate the IRs of the active small-cap funds using the two small-cap benchmarks here studied. With all the active funds in the Lipper Small-Cap Core Fund category as the universe, the average IR of the fund universe is computed on a quarterly basis from December 1996 through December 2014[4] (see Exhibits 13 and 14), using rolling three-year annualized returns. There is a noticeable difference in the average IR of the Lipper Small-Cap Core Fund Category when the S&P SmallCap 600 is used as the benchmark compared with when the Russell 2000 is selected as the benchmark. The average IR is negative for the universe compared to the S&P SmallCap 600 (IR = -0.24), while it is positive when compared to the Russell (IR = 0.25). It should be noted, however, that the IRs are not

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[4] The S&P SmallCap 600 was launched in January 1994.

statistically significant at the 95% confidence level (S&P SmallCap 600 IR t-stat of -0.83, Russell 2000 IR t-stat of 0.88).

**Exhibit 13: Summary Statistics of Lipper Small-Cap Core Funds**

| BENCHMARK | INFORMATION RATIO | INFORMATION RATIO T-STAT |
|---|---|---|
| S&P SmallCap 600 | -0.24 | -0.83 |
| Russell 2000 | 0.25 | 0.88 |

Source: S&P Dow Jones Indices LLC, Russell, Lipper. Data from 1994 through 2014. Past performance is no guarantee of future results. Charts and tables are provided for illustrative purposes and may reflect hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

*Investors may want to consider that the selection of a benchmark definitely matters when it comes to benchmarking in domestic small-cap equity.*

Rolling three-year IRs show that the S&P SmallCap 600 is a harder benchmark for actively managed small-cap fund managers to outperform than the Russell 2000 (see Exhibit 14). For most of the periods studied, the IR computed using the Russell 2000 tends to be higher than that of the S&P SmallCap 600. The finding once again highlights the difficulty investors can have in precisely measuring the effectiveness and skills of a particular manager in the small-cap equity space. Investors may want to consider that the selection of a benchmark definitely matters when it comes to benchmarking in domestic small-cap equity.

**Exhibit 14: Rolling Three-Year IR of Lipper Small-Cap Core Funds**
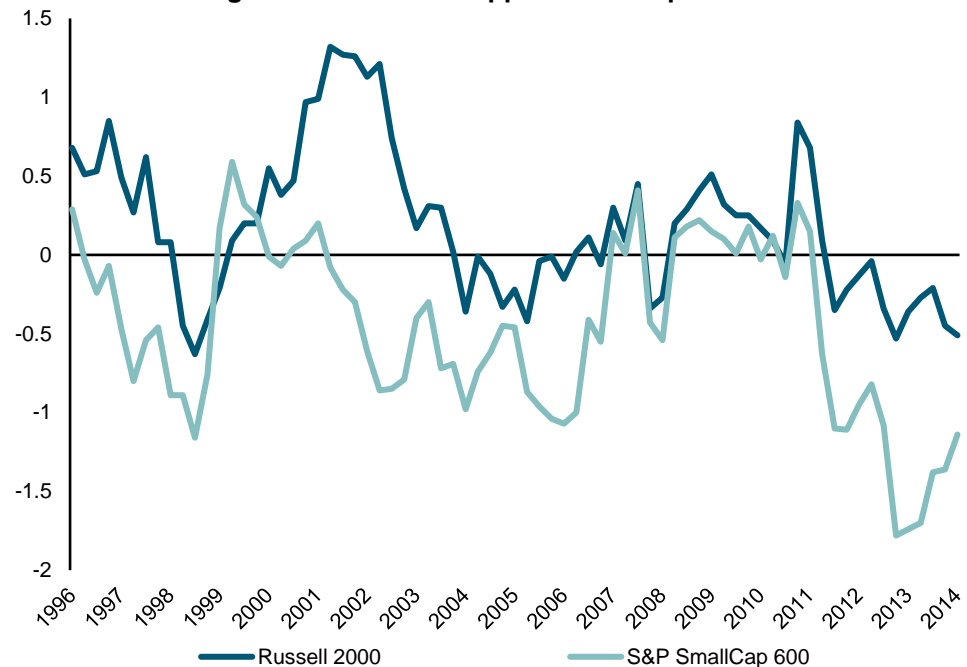


Source: S&P Dow Jones Indices LLC, Russell, Lipper. Data from 1994 through 2014. Past performance is no guarantee of future results. Charts and tables are provided for illustrative purposes and may reflect hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

## CONCLUSION

The substantial return divergence[5] between the S&P SmallCap 600 and the Russell 2000 is a widely documented and researched topic in the small-cap investment universe.  Our analysis adds to the existing literature by showing that the July reconstitution effect alone has not accounted for the excess return of the S&P SmallCap 600 over the Russell 2000.  While the July effect has somewhat decreased since the original S&P Dow Jones Indices research was published, the positive excess return in July still remains today, and it is statistically significant.  The remaining excess return is explained principally by inherent differences in index construction, such as the profitability criteria included in the S&P SmallCap 600.  In addition, we have demonstrated the impact of benchmark return differential in the performance measurement process and its role in distinguishing a successful manager from an unsuccessful one.  As active managers' skills are often based on their performance versus the benchmark, we propose that IR be used as one of the metrics to evaluate the skill of a manager.

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[5]  1.72% per annum as per Exhibit 2.

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| S&P DJI Research Contributors | | |
| --- | --- | --- |
| **NAME** | **TITLE** | **EMAIL** |
| Charles "Chuck" Mounts | Global Head | charles.mounts@spglobal.com |
| **Global Research & Design** | | |
| Aye Soe, CFA | Americas Head | aye.soe@spglobal.com |
| Dennis Badlyans | Associate Director | dennis.badlyans@spglobal.com |
| Phillip Brzenk, CFA | Director | phillip.brzenk@spglobal.com |
| Smita Chirputkar | Director | smita.chirputkar@spglobal.com |
| Rachel Du | Senior Analyst | rachel.du@spglobal.com |
| Qing Li | Associate Director | qing.li@spglobal.com |
| Berlinda Liu, CFA | Director | berlinda.liu@spglobal.com |
| Ryan Poirier | Senior Analyst | ryan.poirier@spglobal.com |
| Maria Sanchez | Associate Director | maria.sanchez@spglobal.com |
| Kelly Tang, CFA | Director | kelly.tang@spglobal.com |
| Peter Tsui | Director | peter.tsui@spglobal.com |
| Hong Xie, CFA | Director | hong.xie@spglobal.com |
| Priscilla Luk | APAC Head | priscilla.luk@spglobal.com |
| Utkarsh Agrawal | Associate Director | utkarsh.agrawal@spglobal.com |
| Liyu Zeng, CFA | Director | liyu.zeng@spglobal.com |
| Sunjiv Mainie, CFA, CQF | EMEA Head | sunjiv.mainie@spglobal.com |
| Daniel Ung, CFA, CAIA, FRM | Director | daniel.ung@spglobal.com |
| Andrew Innes | Senior Analyst | andrew.innes@spglobal.com |
| **Index Investment Strategy** | | |
| Craig Lazzara, CFA | Global Head | craig.lazzara@spglobal.com |
| Fei Mei Chan | Director | feimei.chan@spglobal.com |
| Tim Edwards, PhD | Senior Director | tim.edwards@spglobal.com |
| Howard Silverblatt | Senior Industry Analyst | howard.silverblatt@spglobal.com |

# PERFORMANCE DISCLOSURE

The S&P SmallCap 600 was launched on Oct. 28, 1994. All information presented prior to an index's Launch Date is hypothetical (back-tested), not actual performance. The back-test calculations are based on the same methodology that was in effect on the index Launch Date. Complete index methodology details are available at www.spdji.com.

S&P Dow Jones Indices defines various dates to assist our clients in providing transparency. The First Value Date is the first day for which there is a calculated value (either live or back-tested) for a given index. The Base Date is the date at which the Index is set at a fixed value for calculation purposes. The Launch Date designates the date upon which the values of an index are first considered live: index values provided for any date or time period prior to the index's Launch Date are considered back-tested. S&P Dow Jones Indices defines the Launch Date as the date by which the values of an index are known to have been released to the public, for example via the company's public website or its datafeed to external parties. For Dow Jones-branded indices introduced prior to May 31, 2013, the Launch Date (which prior to May 31, 2013, was termed "Date of introduction") is set at a date upon which no further changes were permitted to be made to the index methodology, but that may have been prior to the Index's public release date.

Past performance of the Index is not an indication of future results. Prospective application of the methodology used to construct the Index may not result in performance commensurate with the back-test returns shown. The back-test period does not necessarily correspond to the entire available history of the Index. Please refer to the methodology paper for the Index, available at www.spdji.com for more details about the index, including the manner in which it is rebalanced, the timing of such rebalancing, criteria for additions and deletions, as well as all index calculations.

Another limitation of using back-tested information is that the back-tested calculation is generally prepared with the benefit of hindsight. Back-tested information reflects the application of the index methodology and selection of index constituents in hindsight. No hypothetical record can completely account for the impact of financial risk in actual trading. For example, there are numerous factors related to the equities, fixed income, or commodities markets in general which cannot be, and have not been accounted for in the preparation of the index information set forth, all of which can affect actual performance.

The Index returns shown do not represent the results of actual trading of investable assets/securities. S&P Dow Jones Indices LLC maintains the Index and calculates the Index levels and performance shown or discussed, but does not manage actual assets. Index returns do not reflect payment of any sales charges or fees an investor may pay to purchase the securities underlying the Index or investment funds that are intended to track the performance of the Index. The imposition of these fees and charges would cause actual and back-tested performance of the securities/fund to be lower than the Index performance shown. As a simple example, if an index returned 10% on a US $100,000 investment for a 12-month period (or US $10,000) and an actual asset-based fee of 1.5% was imposed at the end of the period on the investment plus accrued interest (or US $1,650), the net return would be 8.35% (or US $8,350) for the year. Over a three year period, an annual 1.5% fee taken at year end with an assumed 10% return per year would result in a cumulative gross return of 33.10%, a total fee of US $5,375, and a cumulative net return of 27.2% (or US $27,200).

# GENERAL DISCLAIMER