

A TALE OF TWO BENCHMARKS

It is well documented that the returns of two leading small-cap benchmarks, the S&P SmallCap 600[®] and the Russell 2000, have diverged over the last 15 years. In this study, we used attribution frameworks to understand the return differential between the two indices.

The analysis shows that approximately half of the excess returns are attributable to the impact of the July effect, which is caused by the annual Russell reconstitution in June. We expect this effect to moderate over time due to enhancements made to Russell's rebalancing process.

The remaining excess return can be explained by the following:

- The results from Brinson performance attribution model suggest that while there is little impact of sector allocation between the S&P SmallCap 600 and the Russell 2000, the composition of stocks within individual sectors contributes significantly to the performance differential.
- The results from the Fama-French Three Factor model confirm that compared to the Russell 2000, the S&P SmallCap 600 has a higher exposure to value risk.
- The higher value tilt is affected through the S&P SmallCap 600 requirement that additions must have positive earnings. In this paper, we demonstrate that such profitability screens have added to performance in a neutral universe.

All references in this paper can be found in the bibliography at the end of the document.

Contributors:

Aye M. Soe
Director
212.438.1677
aye_soe@sandp.com

Srikant Dash, CFA, FRM
Managing Director
212.438.3012
srikant_dash@sandp.com

David Guarino
Media Contact
212.438.1471
dave_guarino@sandp.com

Introduction

The role of a benchmark is to represent the return to an investment strategy in an investment universe. Active managers' skills can be distinguished from random results by comparing their investment returns to a benchmark that represents their investment universe. In general, a benchmark represents a return to a passive strategy. If benchmarks are assumed to represent a passive strategy in a given investment universe, then returns among various benchmarks should be similar. This similarity appears to be the case in the U.S. large-cap equity universe by looking at how the returns on the Russell 1000 and the S&P 500® closely track each other.

However, in the small-cap universe, returns between the Russell 2000 and the S&P SmallCap 600 are significantly different. Using monthly total returns from 1994-2009, Exhibit 1 charts the growth of an investment of US\$ 1.00 in the S&P 500 and Russell 1000, and in the S&P SmallCap 600 and Russell 2000.

Exhibit 1: Cumulative Returns on Investments



Source: Standard & Poor's, Frank Russell. Data from January 1994 – December 2009. Indices are statistical composites and their returns do not reflect payment of any sales charges or fees an investor would pay to purchase the securities the Index represents. Such costs would lower performance. Past performance is not an indication of future returns.

In the U.S. large-cap universe, US\$ 1.00 invested in the S&P 500 and the Russell 1000 from January 1994 through December 2009 would have returned US\$ 3.23 and US\$ 3.29, respectively. Conversely, US\$ 1.00 invested in the S&P SmallCap 600 and the Russell 2000 over the same investment horizon would have returned US\$ 3.87 and US\$ 3.00, respectively.

Since its launch in 1994, the S&P SmallCap 600 has outperformed the Russell 2000, which has a 1978 inception date, in 11 out of the 16 years. From January 1994 through August 2010, the S&P SmallCap 600 returns exceeded those of the Russell 2000 by about 1.7% per year. Exhibit 2 highlights the risk/return profile of the two indices.

Exhibit 2: Risk/Return Profile		
	Russell 2000	S&P SmallCap 600
Returns		
1 Year	7.81%	6.60%
3 Year	-7.44%	-7.11%
5 Year	-0.69%	-0.38%
10 Year	2.48%	4.75%
15 Year	6.01%	7.94%
Standard Deviation		
3 Year	26.97%	26.75%
5 Year	22.24%	21.86%
10 Year	21.14%	20.36%
15 Year	20.88%	19.88%
Sharpe Ratio		
3 Year	-0.315	-0.305
5 Year	-0.143	-0.131
10 Year	0.003	0.115
15 Year	0.130	0.233

Source: S&P Indices. Charts and graphs are provided for illustrative purposes only. Since the S&P Developed BMI Index (and therefore any of its sub-indices) was not in existence during all times referenced in this chart, some of the data is based on back-tested information. Please see page 12 for a discussion on the calculations and the inherent limitations associated with back-tested performance.

The divergence of returns between the two small-cap indices merits further study and an understanding of the factors contributing to the divergence. In this paper, we examine the sources of the return differential.

A Review of Index Mechanics

While both the Russell 2000 and the S&P SmallCap 600 Indices measure returns on a passive investment, the index mechanics between the two differ substantially.

The Russell 2000 represents 2000 U.S. companies based on their market capitalization. The index is reconstituted annually at the end of June. Securities are ranked according to their market capitalization as of the last trading day of May, and those with rankings of 1001 to 3000 are included in the Russell 2000. The unambiguous nature of the index's construction implies that market participants can anticipate the changes and can, therefore, trade accordingly.

In contrast, the S&P SmallCap 600 implements changes on an as-needed basis. To be eligible for inclusion, constituents must meet market capitalization, liquidity, public float, GICS[®] sector representation, and profitability measures. Constituent deletions occur due to bankruptcy, mergers, acquisitions, significant restructuring, or substantial violation of one or more of the eligibility measures. Since Standard & Poor's does not follow a purely mechanical approach, additions and deletions are less predictable and have more of an ability to impact prices compared to the Russell 2000. Exhibit 3 highlights the methodology differences between the two indices.

Exhibit 3: Index Construction Differences		
	S&P SmallCap 600	Russell 2000
Earnings Criterion	Requires four consecutive quarters of positive earnings	None
Liquidity Criterion	Requires annual trading turnover of at least 30% of shares outstanding	None
Public Float Criterion	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, and listing etc.	U.S. Companies, based on criteria such as fixed sets, revenues, and listing etc.
Sector Classification	Global Industry Classification Standard (GICS®)	Proprietary sector classification framework

Source: Standard & Poor's, Frank Russell. For the complete Russell 2000 methodology, please visit http://www.russell.com/indexes/membership/methodology/russell_us_indexes_methodology.asp.

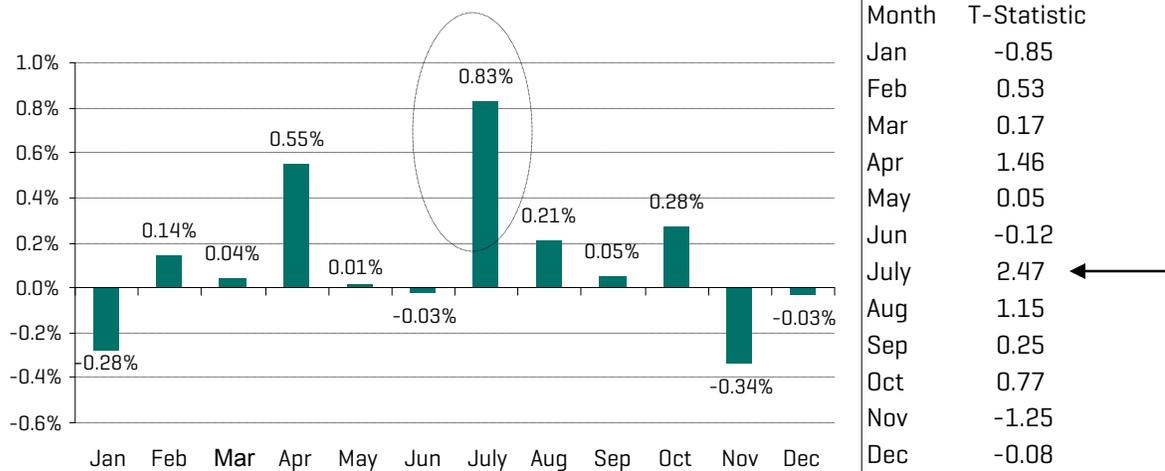
Impact of Reconstitution

Many 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 universe, active 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) also find the rebalancing impact to be 1.3% per year.

Our analysis of the S&P SmallCap 600 monthly excess returns versus the Russell 2000 reveals a similar finding. The analysis examined the average monthly excess returns from January 1994 to August 2010, and noted that the monthly excess returns for July are higher than that of any other month.

Exhibit 4 plots the average monthly excess returns from January 1994 to August 2010. The monthly average excess return for July is statistically significant at a 95% confidence level, providing a strong relationship between the annual June rebalancing and the excess return.

Exhibit 4: Average Monthly Excess Return



Source: Standard & Poor's. Data from January 1994-August 2010.

The July effect may moderate over time as Russell has made enhancements to its rebalancing process in order to lessen its impact. For example, eligible initial public offerings (IPOs) are now added to the Russell 2000 on a quarterly basis. However, the July effect alone does not provide sufficient evidence for the S&P SmallCap 600's outperformance. Exhibit 5 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 the S&P SmallCap 600's excess return.

Exhibit 5: Return By Calendar Year				
Year	S&P SmallCap 600	Russell 2000	S&P SmallCap 600 - Russell 2000	Number 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%	-8.47%	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	0.01%	0.00%	0.01%	5
1994-2009	8.30%	6.62%	1.68%	104

Source: Standard & Poor's and Frank Russell. Data from January 2004 through December 2009. Indices are statistical composites and their returns do not reflect payment of any sales charges or fees an investor would pay to purchase the securities the Index represents. Such costs would lower performance. Past performance is not an indication of future returns.

To further segregate the relative performance while controlling for the July reconstitution effect, a hypothetical Russell 2000 was created in which the month of July returns are represented by the S&P SmallCap 600's returns. Therefore, the return differential between the S&P SmallCap 600 and the hypothetical Russell 2000 should represent any effect other than the reconstitution effect. Exhibit 6 shows the growth of US\$ 1 in the S&P SmallCap 600, Russell 2000 and the hypothetical Russell 2000.

Exhibit 6: Controlling for the Reconstitution Effect



Source: Standard & Poor's. Data from January 1994-December 2009. The Hypothetical Russell 2000 was hypothetically constructed by replacing the month of July returns of Russell 2000 Index with those of S&P SmallCap 600.

From December 1993 to December 2009, an investment of US\$ 1.00 in the Russell 2000 and the hypothetical Russell 2000 would have yielded US\$ 3.00 and US\$ 3.45, respectively, while the same investment in the S&P SmallCap 600 would have returned US\$ 3.87.

The difference between the Russell 2000 and the S&P SmallCap 600 amounts to US\$ 0.87, while the difference between the hypothetical Russell 2000 and the S&P SmallCap 600 is US\$ 0.42. Therefore, approximately half of the excess returns may be attributable to the reconstitution effect, with the other half stemming from factors other than reconstitution.

Performance Attribution

Performance attribution attempts to explain the sources of a portfolio's performance relative to its benchmark over a specific period of time. One of the widely used performance attribution models is that proposed by Brinson and Fachler (1985), in which the sources of a portfolio's active return are broken into three components:

1. Allocation effect – the portion of the portfolio's excess return attributable to over- or under-weighting of securities in a particular grouping (country, sector, beta, etc.) relative to the benchmark.
2. Selection effect – the portion of the portfolio's excess return attributable to selecting different securities within each group from the benchmark.
3. Interaction effect – the portion of the portfolio's excess return attributable to combining the allocation effect with the selection effect.

Using the multi-period Brinson attribution model, we analyzed the S&P SmallCap 600 excess return relative to the Russell 2000. By evaluating in this framework, the analysis seeks to show whether a particular grouping explains the sources of S&P SmallCap 600 active return.

The Brinson study used the daily total returns of the two indices from 1994-2009. The returns are grouped into the following three categories:

1. Sector - as defined by the Global Industry Classification Systems (GICS®)
2. Size - as defined by market capitalization
3. Valuation - as defined by P/B ratio

Exhibit 7 below summarizes the results, which represent the average annual effect of each component of performance attribution. The results of sector-based attribution are particularly interesting. They indicate that the sector allocation differential between the S&P SmallCap 600 and the Russell 2000 does not account for much of the return difference, contributing only 0.24% out of the 1.41% excess return. Most of the excess return stems from the selection effect or the composition within each sector. When grouping by market cap, allocation and selection effects appear to contribute equally to the excess return, with no single effect dominating the other. Results from valuation based attribution show that allocation effect is slightly higher.

Exhibit 7: Performance Attribution - S&P SmallCap 600 vs. Russell 2000				
Grouping	Allocation Effect	Selection Effect	Interaction Effect	Total Effect
Sector	0.24	1.07	0.10	1.41
Size	0.82	0.76	-0.17	1.41
Valuation (P/B)	0.83	0.56	0.02	1.41

Source: FactSet. Data from January 1994-December 2009.

Groupings by size and valuation within the performance attribution framework do not provide conclusive evidence as to whether the S&P SmallCap 600 has size or valuation exposure. The attribution results only indicate that under- or over-weight positions in size and valuation groupings explain much of the excess return. To further explore the impact of size and valuation, the Fama-French Three Factors model was examined.

Return Attribution Using the Fama-French Three Factor Model

The analysis employed tested to see if the characteristics of the small-cap indices can be explained in the traditional Fama-French Three Factor model framework (1993). In the model, portfolio returns are explained using their exposures to three factors: sensitivity to the market (beta), size of the stocks in the portfolio (size), and average weighted book-to-market (value).

The risk premium for each factor is defined as follows:

1. Equity Risk Premium – As represented by $(R_M - R_F)$, which is the return on a market value-weighted equity index minus the return on one-month T-Bill. It measures the systematic risk.
2. Size Premium – As represented by SMB (Small Minus Big), 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 – As represented by HML (High Minus Low), 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.

The FFM estimate of the required return on an asset is:

$$R_i = R_F + \beta_{\text{market}}(R_M - R_F) + \beta_{\text{size}}(SMB) + \beta_{\text{value}}(HML) \quad (1)$$

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

Given the framework above, the historical monthly returns from 1994-2009 of the Russell 2000 and the S&P SmallCap 600 are then regressed against the historical values of (1) the excess return on the market ($R_M - R_F$), (2) the performance of small stocks relative to large stocks (SMB), and (3) the performance of value stocks relative to growth stocks (HML).¹

Results from the FF Three Factor model are summarized in the table below.

Exhibit 8: Return Attribution of Small Cap Indices Using the Fama French Three-Factor Model		
Factors	Fama French Factor Loadings	
	Russell 2000	S&P SmallCap 600
Market	0.94	0.90
Size (SMB)	0.78	0.69
Value (HML)	0.06	0.13

Source: Standard & Poor's. Data from 1994 -2009.

The S&P SmallCap 600 and the Russell 2000 have similar exposure to the market factor. With regard to the size premium, 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 1000 securities of the Russell 2000 are also part of the Russell Microcap Index. The S&P SmallCap 600's higher HML coefficient implies that the index has a higher exposure to the value factor.

The presence of a higher value premium supports the view that the S&P SmallCap 600 has an inherent valuation tilt due to its requirement that securities have four consecutive quarters of positive earnings. In order to determine if the value bias contributes to the excess return, a test was conducted to see whether a profitability criterion imposed on a market capitalization-weighted index can add alpha in the long run. To conduct the study, the universe of U.S. stocks with market capitalization between US\$ 250 million and US\$ 2 billion was divided into two groups:

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

The testing period runs from December 1993 through December 2009. To avoid survivorship bias, the Compustat Research (Inactive database) was used to ensure that all no-longer-existing companies were included in the test universe. To minimize the look-ahead bias, the Charter Oak Compustat non-restated fundamental data with one quarter lag was used. The holding period assumption is 12-months, and the returns are market capitalization-weighted to properly reflect the benchmark. The results are illustrated in Exhibit 9 on the following page.

¹ Historical values for the Fama-French factors are obtained at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

Exhibit 9: Impact of Positive Earnings Screen on Performance						
	Returns	Sharpe Ratio	Information Ratio	T-Stat Alpha	Stock Hit Rate	Beta
Group 1	10.90	0.32	0.29	9.23	48.29	0.83
Group 2	5.69	-0.06	-0.37	-8.75	40.45	1.24
Universe	8.82	0.15			44.98	1.00

Source: Compustat, FactSet. Data from December 1993-December 2009.

Group 2 underperformed the investment universe while Group 1 outperformed it, with the T-stats showing the significance of the returns at 95% confidence interval. The results confirm that securities with at least four trailing quarters of positive EPS outperformed those without positive 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. In our analysis of the small-cap universe, 44.98% 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 40.45% of the time, while securities in Group 1 achieved a stock hit rate of 48.29%, further proving that profitability as a factor provides value.

On a risk-adjusted basis, the performance of Group 1 is superior to that of the universe and Group 2. The Sharpe ratio for Group 1 is higher than the ratios for Group 2 and for the universe. The profitability criterion also results in the beta of Group 1 being lower than the average market beta. Since low beta stocks are often value stocks, it confirms our theory that the profitability screen tilts the portfolio toward a value bias. In contrast, Group 2 has higher average market beta.

The results confirm that the S&P SmallCap 600's profitability requirement plays an integral role in the value bias, and the corresponding excess return over the Russell 2000.

Conclusion

In this paper, we analyzed a widely documented event in the small-cap investment universe: the S&P SmallCap 600 outperforming the Russell 2000 over the last 15 years. The analysis shows that the July reconstitution effect alone does not account for the excess return of the S&P SmallCap 600 over the Russell 2000. The remaining excess return is explained principally by inherent differences in index construction.

The July effect may moderate over time, as Russell has made enhancements to its rebalancing process to lessen its impact. For example, eligible initial public offerings (IPOs) are now added to the index on a quarterly basis. However, it would be interesting to observe if the return differential due to differences in criteria persist over the next 15 years.

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S&P Indices Global Research & Design Contact Information

Global Head

Srikant Dash +1 212-438-3012 srikant_dash@standardandpoors.com

New York

Berlinda Liu +1 212-438-7834 berlinda_liu@standardandpoors.com

Frank Luo +1 212-438-5057 frank_luo@standardandpoors.com

Aye Soe +1 212-438-1677 aye_soe@standardandpoors.com

Peter Tsui +1 212-438-1493 peter_tsui@standardandpoors.com

London

Gareth Parker +44 207-176-8443 gareth_parker@standardandpoors.com

Beijing

Liyu Zeng +86 10-6569-2947 liyu_zeng@standardandpoors.com

Hong Kong

Simon Karaban +852 2532-8050 simon_karaban@standardandpoors.com

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