

THE IMPACT OF RUSSELL 2000 REBALANCING ON SMALL-CAP PERFORMANCE

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Executive Summary

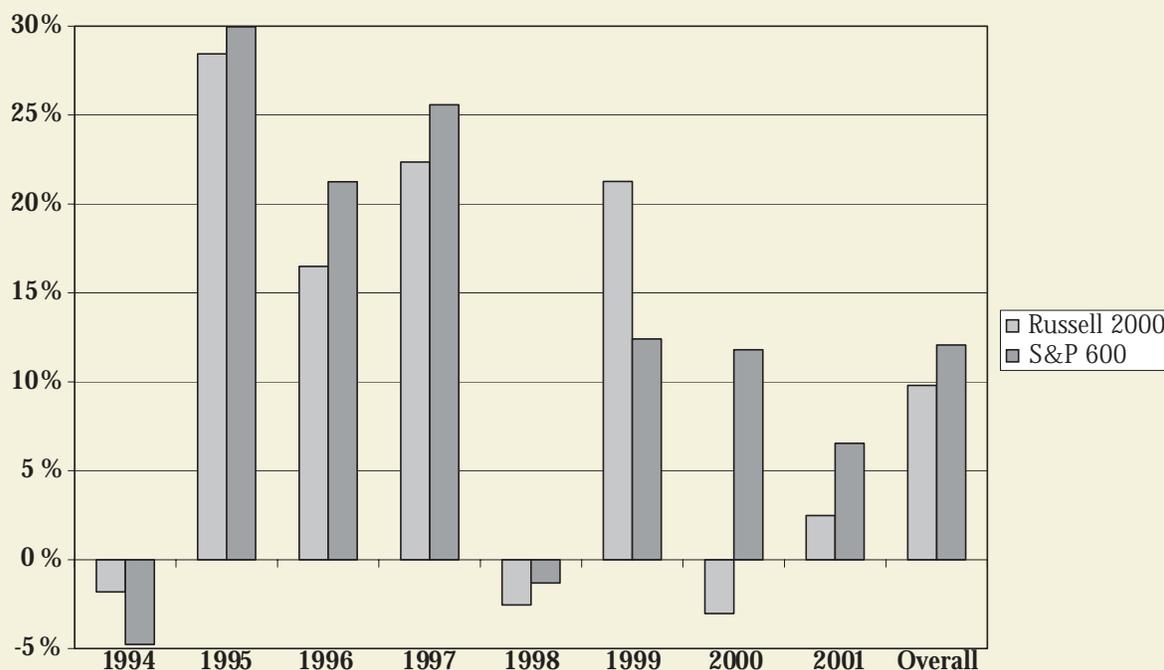
The Russell 2000 Index has long been the benchmark of choice for small-cap investors. However, the rebalancing procedure used to maintain the index's emphasis on small-cap stocks is seriously flawed. The focus of all rebalancing activity on a single day creates substantial performance distortions around the June 30 rebalancing date each year. We show that the speculative trading activity that surrounds rebalancing depresses the return of the Russell 2000 Index by an average of at least 1.2 percent per year. We also explore the implications of this result for the widely held belief that active management is more likely to be successful with small-cap stocks than with large-cap stocks. After adjusting for the mechanical drag of the Russell's rebalancing, we find that the probability of a small-cap core or value manager outperformance is not appreciably different from the probability of outperformance for large-cap managers in the same styles. If pricing in the small-cap market is truly less efficient than in the large-cap market, it does not appear to provide any special advantage to active managers of small-cap stocks, except perhaps in managing growth stocks.

Introduction

The Russell 2000 Index has long been the benchmark of choice for small-capitalization portfolios. Some of the appeal of the index

likely results from its straightforward construction. Each May 31, the Frank Russell Company ranks all U.S. domiciled companies by their market capitalization, identifying those with rankings 1001 through 3000 as small. These stocks become the constituents of the Russell 2000 Index one month later. The problem with this procedure is that literally hundreds of index changes can be identified several months prior to the June 30 rebalancing. Speculators sell the stocks that are likely to leave the index, depressing their prices and the return of the index in the months prior to rebalancing. Speculators also purchase shares of firms likely to be added to the index, anticipating an increase in demand as rebalancing approaches. As a result, stocks often join the index at artificially high prices, creating a drag on index performance as their prices return to more normal levels in the months following rebalancing.

Rebalancing drag may be one factor contributing to the growing popularity of alternative small-cap benchmarks such as the S&P 600 Index. Using tracking error as a means to identify the benchmarks of indexers and enhanced indexers, one can see that the S&P 600 has enjoyed explosive growth since its launch in 1994. Thirteen products included in the early release of the Q4 2001 PSN database had an annualized tracking error of 5 percent or less relative to the S&P 600 Index over the last five years. These products had total assets of

Figure 1: Russell 2000 and S&P 600 Annualized Returns 1994–2001

approximately \$10.4 billion. These figures compare favorably to those for Russell 2000 benchmarked products. Ten products had tracking error of 5 percent or less relative to the Russell 2000 over the same period.¹ Assets invested in these products totaled approximately \$14 billion. Interestingly, there were three products meeting both tracking error criteria. All three had lower tracking error relative to the S&P 600 Index. The popularity of the S&P 600 as an alternative to the Russell 2000 has also been confirmed by direct canvassing of index and enhanced-index providers. The results of a survey published on page 32 of the March 18, 2002 issue of *Pensions and Investments* indicated that 8 percent of all index and enhanced-index managers responding to the survey offered products benchmarked to the S&P 600 while only 4 percent offered products benchmarked to the Russell 2000.

The Impact of Rebalancing on Russell 2000 Index Performance

To gauge the impact of rebalancing on index performance, we compared average quarterly and monthly returns of the Russell 2000 Index and the S&P 600 Index from January 1994 (the date the S&P 600 Index was formed) through December 2001. The S&P 600 Index is a representative sample of 600 stocks with capitalizations similar to those included in the Russell 2000 Index. All other things being equal, the two indexes would be expected to provide similar long-run returns. However, a key difference between the two indexes is the manner in which their respective providers rebalance them. The stocks to be added and deleted from the S&P 600 are determined by the Standard & Poor's Index Committee, using a combination of quantitative and qualitative criteria. Changes to the S&P 600 Index are normally implemented with five or fewer days notice to the financial community. Both the secretive

**Table 2: Average Monthly Excess Return (S&P 600 - Russell 2000)
1994/01–2001/12**

Month	Average	Minimum	Maximum	Standard Deviation	T-Signif.
January	-0.79	-2.59	0.33	0.91	96.1%
February	-0.16	-3.12	1.71	1.40	60.9%
March	0.09	-1.91	2.89	1.34	56.2%
April	0.51	-2.35	4.30	1.85	73.6%
May	0.33	-0.85	2.87	1.19	73.7%
June	-0.13	-2.81	1.17	1.16	60.6%
July	1.47	-0.40	3.74	1.24	98.7%
August	0.44	-0.70	1.24	0.67	91.9%
September	-0.10	-1.70	0.77	0.79	61.3%
October	0.54	-0.66	5.09	1.92	74.3%
November	-0.12	-1.79	1.07	0.82	63.9%
December	-0.12	-3.10	3.73	1.96	55.9%

Both the capitalization and valuation proxies appear to have a statistically significant impact on the size of the return differential. Strong returns to the Micro-Cap Index reduce the size of the S&P 600's return advantage over the Russell 2000, indicating that the Russell 2000 has a greater concentration in micro-cap stocks than the S&P 600. Strong returns to value increase the size of the S&P 600's return advantage, indicating that the Russell 2000 has a greater concentration in growth stocks than the S&P 600. The residuals of this regression provide an estimate of the return difference between the S&P 600 and Russell 2000 that is free of size and value biases. Table 3 reports the result of a month-by-month analysis of these adjusted return differentials. Note that the return differential in January is no longer statistically significant after the size bias is removed. (The Wilshire Micro-Cap Index has its highest average return during the month of January.) However, the July rebalancing effect continues to be statistically significant.

Based on these results, it appears reasonable to conclude that the annual rebalancing of the Russell 2000 depressed the returns of that index by at least 1.2 percent per year during the 1994 to 2001 peri-

od, accounting for more than half of the 2.29 percent average annual return advantage enjoyed by the S&P 600 Index over the Russell 2000 Index.

Implications for the Effectiveness of Small-Cap Active Management

It is generally believed that active managers of small-cap stocks enjoy a higher probability of outperforming their benchmark than active managers of large-cap stocks. This conclusion is of course sensitive to the benchmarks used to gauge manager performance. As we have shown, the returns of the commonly used Russell 2000 small-cap benchmark suffer a substantial downward bias due to the index's highly predictable rebalancing procedure. Correcting for this downward bias would certainly "raise the bar" for small-cap managers and perhaps bring into doubt the assertion that active management is better suited to small-cap stocks than large-cap stocks.

To examine this possibility, we used returns-based style analysis to identify 334 small-cap and 480 large-cap manager return series among the 1,526 manager return series with five years of data reported through December 31, 2001 in the early

**Table 3: Average Monthly Excess Return (S&P 600 - Russell 2000)
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Month	Average	Minimum	Maximum	Standard Deviation	T-Signif.
January	-0.15	-1.40	0.87	0.67	69.8%
February	-0.13	-0.98	1.21	0.75	65.5%
March	-0.50	-2.02	0.33	0.71	93.1%
April	-0.08	-2.89	1.32	1.27	55.7%
May	0.13	-1.08	1.28	0.68	67.1%
June	0.14	-0.64	1.45	0.65	69.5%
July	1.22	-1.03	3.51	1.42	96.0%
August	0.21	-0.41	0.98	0.48	83.6%
September	-0.14	-2.00	0.90	0.91	64.1%
October	0.23	-0.61	3.59	1.39	64.9%
November	-0.41	-2.00	1.02	0.91	84.3%
December	-0.53	-1.70	1.52	1.06	86.7%

release of the PSN database for the fourth quarter of 2001. The returns-based style analysis was conducted using Zephyr Style Advisor Software and a style basis consisting of the Russell 1000 Growth and Value along with the Russell 2000 Growth and Value Indexes. Manager return series that had a “small-large” score greater than 0.50 were classified as large. Those with a score of less than -0.55 were classified as small. The goal of this screening process was to ensure that mid-cap managers were excluded from both samples. Hence, the choice is aggressive hurdle values for the “small-large” score that resulted in small sizes for both the small-cap and large-cap groups relative to the manager universe. Additional returns-based style analysis was used to segregate the small-cap and large-cap samples into managers employing value, growth, and blended styles of management.⁴ The five-year length of the study period represents a compromise between the desire for precision in style classification (which might be enhanced by use of a longer time period) and a desire to minimize the potential impact of survivor bias on study results (which favors a shorter time period).

Table 4 reports results for comparisons of the returns of small-cap managers within three style categories to the returns of both Russell 2000- and S&P 600-based style benchmarks. The number of managers within each style category are listed in the column labeled “#.” The Russell-based benchmarks used were the Russell 2000 Value for value managers, the Russell 2000 for blend managers, and the Russell 2000 Growth for growth managers. The average annual returns for each of these benchmarks, over the five years ending December 31, 2001, are listed in the first column labeled “Return.” The S&P-based benchmarks used were the S&P/BARRA 600 Value for value managers, the S&P 600 for blend managers, and the S&P/BARRA 600 Growth for growth managers. The average annual returns of these benchmarks are listed in the second column labeled “Return.” The returns of the S&P 600-based benchmarks provide an approximate estimation of the rebalancing bias present in the Russell 2000 benchmark returns. Correcting for rebalancing bias results in a reduction of 12 percent to 24 percent in the number of managers outperforming their benchmark, depending on the style category.

**Table 4: Small-Cap Manager Performance vs. Assorted Benchmarks
1997/01–2001/12**

Style	#	Russell Benchmarks			S&P Benchmarks		
		Benchmark Return	Managers That Outperform	Percentage That Outperform	Benchmark Return	Managers That Outperform	Percentage That Outperform
Value	157	11.20%	111	70.7%	12.78%	92	58.6%
Blend	88	7.52%	77	87.5%	10.66%	56	63.6%
Growth	89	2.87%	83	93.3%	7.05%	69	77.5%

The results for a similar analysis of large-cap managers are reported in table 5. In this case, the Russell-based benchmarks used were the Russell 200 Value for value managers, the Russell 200 for blend managers, and the Russell 200 Growth for growth managers. The S&P-based benchmarks used were the S&P/BARRA 500 Value for value managers, the S&P 500 for blend managers, and the S&P/BARRA 500 Growth for growth managers. The degree of manager success against the highest-performing large-cap benchmark, Russell-based for value and S&P-based for blend and growth, is highlighted in boldface type. In comparing these results with the similarly highlighted small-cap manager results in table 4, one sees that value and blend managers in both samples enjoyed similar degrees of success. Small-cap value managers did perform slightly better than their large-cap counterparts, with 58.6 percent outperforming versus 55.7 percent in the large-cap sample. Meanwhile, large-cap blend managers had a slight advantage

over their small-cap counterparts, with 66.9 percent outperforming versus the 63.6 percent degree of success for small cap.

The only style category where small-cap active managers enjoyed a large advantage was growth. In this category, 77.5 percent of the small-cap growth managers were able to outperform versus only 44.9 percent of large-cap managers.

Conclusions

The highly predictable nature of the Russell 2000 rebalancing appears to bias the returns of that index downward by an average of at least 1.2 percent per year. After adjusting for this downward bias in the well-known small-cap benchmark, much of the perceived performance advantage of small-cap active managers over their large-cap counterparts disappears. Over the five years ending December 31, 2001, small-cap and large-cap managers of value- and blend-style prod-

**Table 5: Large-Cap Manager Performance vs. Assorted Benchmarks
1997/01–2001/12**

Style	#	Russell Benchmarks			S&P Benchmarks		
		Benchmark Return	Managers That Outperform	Percentage That Outperform	Benchmark Return	Managers That Outperform	Percentage That Outperform
Value	88	11.21%	49	55.7%	9.49%	69	78.4%
Blend	254	10.50%	187	73.6%	10.70%	170	66.9%
Growth	138	8.59%	105	76.1%	11.10%	62	44.9%

ucts enjoyed similar degrees of success in outperforming their respective benchmarks. The one area where small-cap managers enjoyed greater success than large-cap managers was in managing growth stocks.

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Endnotes

1. The number of managers proclaiming their benchmark to be the Russell 2000 is much higher. However, self-identification is likely to be biased by the obvious incentive that managers have to measure their performance against a benchmark with weak performance. For this reason, we decided to use a behavioral criterion to identify manager benchmarks more objectively. The choice of the 5 percent tracking error cutoff point is somewhat arbitrary, but it represents a good compromise

between the desire to differentiate managers (which argues for a low cutoff value) and the desire to identify several managers in each group (which argues for a high cutoff value).

2. One-sided test based on a t -distribution with six degrees of freedom.

3. Wilshire Associates rebalances their indexes once per year at the end of June just as Russell does. However, their capitalization cutoffs and value classification scheme are different. One thing that is particularly commendable about Wilshire's style classification is that it does not force every stock from the benchmark index into a style category. This enhances the ability of Wilshire's indexes to distinguish growth and value behavior by eliminating middle-of-the-road stocks that would otherwise water down style performance.

4. Manager return series that had a "value-growth" score greater than 0.33 were classified as growth. Those with a score of less than -0.33 were classified as value. The remainder were classified as blend.