Appendix to The Hidden Costs of Changing Indices

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Analysis of Vanguard 2003 Index Transition from S&P 400 to MSCI US Mid Cap 450

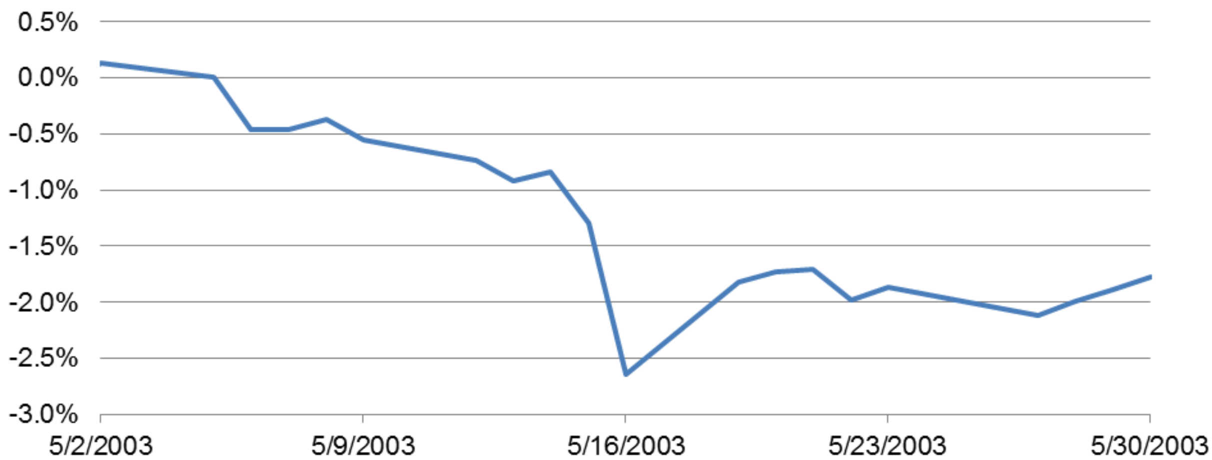
Vanguard announced that the transition to the new MSCI benchmark was expected to occur between April 20 and September 30, 2003. After the close of trading on Friday, May 16, 2003 it was announced that the mid cap transition had occurred. Therefore, the benchmark index was the S&P MidCap 400 index (the legacy index) through May 16 and beginning on May 19 the benchmark had transitioned to the MSCI Mid Cap 450 index (the target index). The below table provides the cumulative monthly returns differences for each of these relative to the Vanguard fund: the returns on the fund minus the target index, the returns on the fund minus the legacy index, and the returns on the fund minus the benchmark index. Return data for the S&P and MSCI indices is from Morningstar and the Vanguard fund performance is taken from its website. The returns show that the legacy and benchmark indices perform similar to the fund through April 2003 with the fund underperforming by 8 basis points. However, beginning in May the fund outperforms the benchmark while underperforming relative to the legacy index. By the end of the year the fund has outperformed the benchmark by 84 basis points while the fund underperformed the legacy index by 1.30%. Why is this underperformance not visible relative to the benchmark? Presumably because Vanguard's selling temporarily depresses the legacy index prior to the transition on May 16. Afterwards the legacy rebounds causing the legacy to outperform the benchmark. The underperformance relative to the target index is even worse at 4.10%, most of which occurs in May. The somewhat different patterns in fund performance relative to the target and legacy indices could arise from the stock market rising rapidly during May as the legacy and target indices rose by 8.29% and 10.06%. Buying into such a rising market is generally much more costly than selling.

Table 1. Cumulative monthly returns in 2003 for the Vanguard midcap mutual fund relative to the legacy index (S&P 400 MidCap), target index (MSCI Mid Cap 450), and benchmark index (S&P 400, then MSCI).

	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03	Jul-03	Aug-03	Sep-03	Oct-03	Nov-03	Dec-03
Target	-0.42%	-1.22%	-1.01%	-1.22%	-3.66%	-3.62%	-3.67%	-3.88%	-3.72%	-4.05%	-4.03%	-4.10%
Legacy	-0.01%	-0.02%	-0.01%	-0.08%	-0.60%	-1.20%	-1.85%	-1.69%	-1.54%	-1.81%	-2.56%	-1.30%
Benchmark	-0.01%	-0.02%	-0.01%	-0.08%	0.41%	0.48%	0.55%	0.54%	0.64%	0.63%	0.78%	0.84%

The below figure examines the detailed dynamics of the relative performance of the legacy and target indices around the May 16 transition. The figure graphs the daily cumulative difference in returns between the legacy and target indices. The difference becomes negative approaching May 16 which could arise from Vanguard beginning to sell the legacy and accumulate the target beforehand. On May 16 the legacy index falls 1.29% relative to the target, consistent with Vanguard heavily selling the legacy and buying the target that day. The partial reversion on Monday May 19 of the return spread could be due to Vanguard's announcement of the transition which enabled the market to realize the buying and selling pressures on May 16 were due to the transition. The underperformance of the legacy index remains relatively constant over the rest of the month at close to 2%.

Figure 1. Cumulative daily returns difference in May 2003 between the legacy index (S&P 400 MidCap) and the target index (MSCI Mid Cap 450).



The full year and month of May analysis for the Vanguard mid cap mutual fund transition are consistent with changing indices being costly and a benchmark index being unreliable for measuring underperformance.