Response to Rob Arnott's Defense of Fundamental Indexing

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In much of his interview in the February 3 issue of *Advisor Perspectives*, titled "Rob Arnott Defends Fundamental Indexing," Arnott tries to defend his claims for fundamental indexing against criticisms that have been leveled by me. Arnott attempts a defense on one point, while on another major point he mounts no real defense but simply nullifies claims he has made repeatedly in the past.

Fundamental indexing is a weighting algorithm for tilting a broadly diversified portfolio in favor of a particular stock valuation philosophy. In practice it usually favors a value stock tilt.

My criticism of fundamental indexing is not of the algorithm used to do the tilting (that is, the algorithm that assigns weights to the stocks in a portfolio, given that there is a preference for one stock over another). My criticism is of the excessive claims made by promoters of the fundamental indexing methodology.

The promoters are not content to rest their case on the empirical evidence that an index weighted more heavily in value stocks would have significantly outperformed a market-weighted index historically. They go much further by intimating that it is mathematically provable that a fundamentally-weighted index must outperform a capitalization-weighted index. These intimations of mathematical certainties have mostly been made verbally (though erroneous proofs using mathematical notation have been attempted). When the verbal claims are analyzed, they do not stand up to scrutiny.

Does a cap-weighted index portfolio hold more in overpriced stocks?

One of the claims made by Arnott is that "If we have a cap-weighted portfolio, we know most of our money is in companies that are above fair value."[i]

In the January 17, 2009, issue of *Advisor Perspectives*, I showed that we know no such thing, by presenting a simple counterexample:

Consider a two-company world. Company A has a fair value of $10 billion with a market value of $9 billion, and Company B has a fair value of $5 billion with a market value of $6 billion. If we have a $150,000 market-cap-weighted portfolio, it will have $90,000 in Company A, the undervalued company, and $60,000 in Company B, the overvalued company. It will not have most of its money in companies that are above fair value—it will have most of its money in the company that is below fair value.

Arnott calls this "a deceptive example." Then he adds the condition that we must be able to "divide the universe in two equal halves by fair value."

But his added condition doesn't invalidate the example. All that is necessary is to divide each company in the two-company world into a number of smaller but identical companies. Then that world will divide into two halves by fair value; yet the portfolio still has most of its money in companies that are below fair value.

Let us walk further with Arnott. He makes much of the fact that you have to be able to divide the universe in two equal halves by fair value. Then he says, referring to my example:

In this case, the cap-weighted investor has 60% invested in the undervalued stock [$90,000 out of $150,000] … which represents 67% of the fair value of the market [$100,000 out of $150,000]. The overvalued *half* of the fair value portfolio consists of $7.5 billion in fair value: Company B plus one-fourth of Company A. The undervalued *half* of this universe consists of $7.5 billion in fair value: the remaining three-fourths of Company A. The cap-weighted investor has $8.25 billion invested in the overvalued former portfolio and $6.75 billion in the undervalued latter portfolio.

This really *is* a deceptive example, if it is meant to prove that most of the money is in companies that are above fair value. Let's suppose that instead of one company with a fair value of $10 billion and a market value of $9 billion, Company A is split into four companies, A_1, A_2, A_3 and A_4, each with a fair value of $2.5 billion and a market value of $2.25 billion. Then Companies A_1, A_2 and A_3 have fair values totaling $7.5 billion, while A_4 and B together have fair values also totaling $7.5 billion—hence, the additional condition that Arnott wants to impose, that the universe can be divided in two equal halves by fair value, is satisfied. But Companies A_1, A_2, A_3 and A_4, comprising most of the portfolio at a total of $9 billion, are all undervalued, while only Company B, comprising $6 billion of the portfolio, is overvalued.

Thus, it's still the case that more than half ($90,000) of the $150,000 market-cap-weighted portfolio is in undervalued companies and less than half ($60,000) in

overvalued companies—there's no deception. Mr. Arnott's claim is simply false. An infinite number of other counterexamples can also be constructed.

Is a cap-weighted index portfolio mispriced on average?

A second major claim Arnott has repeated frequently is that "capitalization-weighted indexes overweight overpriced stocks and underweight underpriced stocks."

If capitalization-weighting overweights overpriced stocks and underweights underpriced stocks, then the capitalization-weighted market portfolio must be overpriced on average.

But *Advisor Perspectives* posed this question to Mr. Arnott:

> In your papers, in which you approach fundamental indexing mathematically, you assume that the market price of a security is an unbiased estimator of its fair value—which of course means that the average of all mispricings in the market is zero. But doesn't that obviously also mean that the average mispricing in a market-cap-weighted portfolio is zero—and doesn't that contradict your basic premise?

Arnott answers, "This is a mathematical truism." In saying that it is a mathematical truism Arnott concedes that the average mispricing in a market-cap-weighted portfolio is zero. He can therefore no longer claim that a market-cap-weighted portfolio has a built-in "structural performance drag"—as he has claimed many times—because it is not on average mispriced. And it cannot be true that capitalization-weighting overweights overpriced stocks and underweights underpriced stocks, because if it were true, then the market *would* be overpriced on average.

In short, the intimations of mathematical certainties that advocates attribute to fundamental indexing are completely groundless. All that can be claimed for it is that it is an algorithmic methodology for the tilting of a portfolio toward a stock selection philosophy that is attractive because it has exhibited superior returns in the past. This places it securely in the crowded field of active management.

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[i] *Journal of Indexes*, January/February 2009, page 33.