Let’s Not All Become Fundamental Indexers Just Yet

By Paul Kaplan

The air is coming out of the argument that fundamental indexing is a revolutionary innovation.

Fundamental indexing has been touted by its proponents as a revolutionary innovation in the field of passive investing. Weighting stocks by market capitalization, they say, inevitably causes a drag on performance, owing to the market’s inherent mispricing of stocks. Their claims are based on a paradigm of asset pricing called the “noisy market hypothesis,” which argues that stocks’ market prices stray from their fair values in a random fashion, and that because they do, market-cap-weighted portfolios—which inherently favor stocks with rising prices—are skewed toward overvalued stocks. (For our purposes, consider the definition of “fair value” to mean a number that would represent the “true” or intrinsic value of a stock that would perfectly describe its worth.) Hence, the reasoning goes, a portfolio with weightings that are derived independently of market value, such as a fundamental weighted index, will outperform its market-cap-weighted counterpart.

The fundamental indexers’ biggest criticism against cap-weighted indexes stands on flimsy ground, though. André Perold of Harvard Business School demonstrated in a paper in Financial Analysts Journal (November/December 2007), for example, that even if market prices deviate from fair values, it does not automatically follow that cap-weighted indexes load up on overvalued stocks. That is because there is simply no reason to conclude at the outset that a stock that commands a high valuation is overpriced. It is just as likely that the “expensive” stock deserves its premium because of its superior growth prospects, or that a “cheap” stock’s fair value could be even lower than its market price. Proponents of fundamental indexing make their case against market-cap weighting by implicitly (and perhaps unknowingly) assuming that a market observer does know a stock’s fair value, thereby contradicting one of their own assumptions.

The Independence Assumption

As noted, one of the main underpinnings of the fundamental-indexing case is the claim that while fundamental weights may not be a perfect expression of stocks’ fair values, the errors they include—the difference between their fundamentally determined weights and those that would accurately reflect stocks’ fair values—are not correlated with market values. This “independence assumption” is crucial, because without it, claims of theoretical superiority of fundamental weighting over market-cap weighting do not hold.

Here’s the problem: The independence assumption has absurd implications about the fair values of stocks.

In order for the independence assumption to hold, at least one of the following conditions must be met:

- Valuation ratios, if calculated using fair values, must be the same across stocks; or
- Market values must be completely unrelated to fair values.

Both scenarios are difficult to imagine, to say the least. Companies have different growth and risk characteristics, so even stocks with the same earnings clearly do not deserve the same price multiple. And even after making allowances for pricing errors, market values should clearly have some relationship to fair values. Hence, the independence assumption cannot hold. Ultimately, this means that fundamental indexing proceeds from logic that is internally inconsistent. In particular, the conclusion that a fundamentally weighted index has a higher expected return than a market-weighted index simply lacks theoretical foundation.

I refer to a valuation ratio calculated using a stock’s theoretical fair value as a “fair value multiple.” Mathematically, a fair value multiple is the (unobservable) number $M^*$, which we define as a ratio of the (unobservable) fair value of a stock ($V^*$) over some observed fundamental measure of company size, such as earnings or book value ($F$): $V^* = FM^*$ or $M^* = V^*/F$.

Put another way, a stock’s fair value multiple is the ratio of a stock’s “true” fair value relative to a fundamental size measure that is being
used as an alternative to market capitalization when calculating a stock’s portfolio weight.

Recall that proponents of fundamental indexing assert that fundamental weights can be unbiased estimators of the unobservable fair value weights with “errors” that are statistically independent of market values—the independence assumption. It turns out, however, that the so-called errors are actually restatements of the stocks’ fair value multiples. For example, if the fundamental weights are based on earnings, errors in the fundamental weights are restatements of the fair P/Es of the stocks. For example, if the fundamental weights are based on earnings, errors in the fundamental weights are restatements of the fair P/Es of the stocks. This conclusion follows from the very way that such proponents of fundamental indexing define the error for a given stock; namely, as the ratio of the fundamental weight to the fair value weight minus one. (See Jason Hsu, “Cap Weighted Portfolios Are Sub-Optimal,” Journal of Investment Management, Third Quarter 2006.) Because the fundamental weight is proportional to the fundamental size measure and the fair value weight is proportional to fair value, this “error,” being a restatement of the ratio of the two weights, is therefore also a restatement of the ratio of fair value to the fundamental size variable; in other words, the stock’s fair value multiple.

By way of analogy, imagine that we have a collection of gems of various types, qualities, and weights. We find out the market value of each gem, write it on a bag, place the gem in the bag, and seal the bag. Once we have sealed the bags, we cannot tell which gem—or its type or quality—is in which bag. We do have a scale, however, so we weigh each bag and write the weight on the bag as well as each gem’s market value. As with stocks, for each gem, we know its market value and have a fundamental measure of size (weight), but we do not know its fair value or fair value multiple (fair price per ounce). Unless all the gems are of the same type and quality, however, or their market values are completely unrelated to their fair values, there is some relationship between the market values written on the bags and the fair prices per ounce of the gems inside them. Clearly, we would not want to rely on weight alone to assess the value of each bag’s contents.

Proponents of fundamental indexing are effectively asking us to rely solely on weight, though, while at the same time assuring us that the market values they are choosing to ignore have no relationship whatsoever to the type or quality of the gems inside the bags.

**Why Fundamental Indexing Might Work**

A stock’s fair value multiple, by definition, reflects investors’ assessments of the stock’s risk and future growth prospects. Ideally, such factors should be fully taken into account in portfolio construction. Because one must actually know a stock’s fair value to pinpoint the magnitude of those factors, though, they are effectively unobservable. To engage in portfolio construction, therefore, one must either ignore those factors or take them into account by using proxies. Market-cap weighting inherently takes risk and expected growth into account by using the market values of stocks as proxies for their unobservable fair values. To be sure, if market prices contain noise, then market-cap weights contain errors. Yet fundamental weighting schemes introduce weighting errors of a different type. They throw the baby out
with the bath water by spurning market-value information, thereby completely ignoring risk and expected growth. The superior weighting scheme should be the one that makes the less egregious type of error. It stands to reason then that fundamental indexing is not the inevitably superior choice based on a revolutionary new theory. Instead, as critics point out, fundamental indexing is nothing more than value investing in a different guise.

If a fundamentally weighted portfolio is to outperform a market-cap-weighted portfolio of the same stocks, the fundamental variables used to construct the weights must contain more information about the fair values of the stocks than the market values of the stocks contain. For example, if earnings are chosen as the fundamental weighting metric, then earnings must be a better indicator of a company’s true worth than the market price of its stock.

In an article that I recently published in the *Financial Analysts Journal* (January/February 2008), I used a mathematical concept known as a boundary condition to help frame the question. Even though it cannot provide the ultimate answer, deriving this boundary condition can help us to better see the nature of the question and what conditions would have to be met for one method to be demonstrably better than the other.
The Value Bias

I did this by demonstrating that if the variation in market valuation errors exceeds the variation in fair value multiples (used in fundamental index construction), the correlation between fundamental values and fair values will be greater than the correlation between market values and fair values. If that were to hold true, it would show fundamental weighting to be superior to market-cap weighting. Conversely, if the variation in fair value multiples exceeds the variation in market valuation errors, the correlation between market values and fair values would be greater than the correlation between fundamental values and fair values. In that case, market-cap weighting would be clearly superior to fundamental weighting.

Ultimately, though, the question of which is greater, the variation in fair value multiples or the variation in market valuation errors, cannot really be answered because it is about unobservable variables. The very fact that the question remains so broadly open, though, illustrates that claims made by proponents of fundamental indexing do not really rise to the level of a theory. Rather, they are demonstrably only a conjecture.

The Value Bias

Historical performance data do give fundamental indexing a sizable edge over capitalization-weighted indexing. But as I mentioned, some critics of fundamental indexing point out that fundamental weighting is simply an alternative way to introduce a value bias into a portfolio. Value-biased portfolios have historically outperformed unbiased portfolios, so it is no surprise that a fundamentally weighted index outperforms a market-cap index of the same stocks in a long-term back test.

In my Financial Analysts Journal article, I derive a mathematical formula for the value bias of fundamental weighting. Defining the yield on a stock as the ratio of the fundamental size measure to market value, I define the magnitude of a portfolio’s value bias as the difference between the portfolio’s yield and that of its market-cap-weighted version. I show that this is the ratio of the variance of yield across the stocks in the index to the yield on the market-weighted index. This is not a boundary condition; it is true by construction. Thus, the conclusion that fundamental indexing contains a value bias does not depend on circumstances (that is, on the observed values of variables). It is always true.

Best of Both Worlds

While fundamental indexing cannot justifiably claim to be a revolutionary new paradigm, it does introduce worthwhile ideas for enhancing capitalization-weighted indexes. Effectively, because both fundamental and market-cap weights contain some information about a stock’s fair value, combining the two weighting schemes can potentially produce results that are better than using either one alone.

One indexing methodology that uses that approach is “collared” weighting, which seeks to preserve the benefits of market-cap as well as fundamental weighting while minimizing the disadvantages of each. Sanjay Arya, who is Morningstar’s director of indexes, and I discussed the collared approach in the 2007 Morningstar Index Yearbook and in a Morningstar working paper, “Collared Weighting: A Hybrid Approach to Indexing.” I briefly summarize it here.

One major advantage of market-cap weighting is that the portfolio does not require regular rebalancing and, thus, generates less transaction costs compared with a non-cap-weighted weighting scheme. On the other hand, market-cap weighting can lead to volatile levels of diversification because a stock that keeps on rising has an increasingly large portfolio weight. A collared weighting scheme addresses these issues by weighting according to market cap unless a stock’s market-cap weight deviates significantly from its fundamental weight. When market weights get far out of line, collared weighting reins them back in by linking them to fundamental weights.

A collared weighting scheme uses fundamental weights to set boundaries on portfolio weights rather than to be the portfolio weights themselves. These boundaries (or collars) are fixed multiples of the fundamental weights, such as a lower bound of half the fundamental weight and an upper bound of twice the fundamental weight. Stocks are held in the index at their market value weights unless such weights fall outside the boundary, in which case they are held at the boundary they violate. The idea is to take advantage of the low transaction costs of market-cap weighting while avoiding concentration in a few large stocks during market run-ups, such as occurred in the late 1990s.

On the one hand, collared weighting can help investors avoid exaggerated stakes in overvalued growth stocks. At the same time, collared weighting moderates the value bias (as well as the higher turnover and higher cost) associated with fundamental weighting.

Conclusion

Proponents of fundamental indexing, rather than having a theory on which to base their claims, have only a conjecture that market valuation errors are more variable than the variability of fair market multiples. They may have been correct over long historical periods, as the successful back tests of their strategies seem to demonstrate, but they should be much more modest in their claims. In particular, they could argue that it is better to introduce a value bias into a portfolio by using their weighting scheme than by excluding low-yield stocks. In other words, they could promote fundamental indexing as a more disciplined, systematic approach to value investing. But they have not, to date, pursued this more humble line of reasoning. They may have a successful investment strategy, but they have not produced a revolution in investment theory.

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