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Capitalization or Fundamentally Weighted Indices?

Victor A Canto

Over the last decade we seen a have surge in popularity of the fundamentally weighted index, a type of equity index in which components are chosen based on fundamental criteria as opposed to market capitalization. The rationale for using fundamentally weighted indices can be at the Research Affiliates website. Here is what they have to say:

Market-capitalization, or market-cap, weighting relies on price to select and weight stocks in a portfolio. A company's market cap is the prevailing price of its stock multiplied by the number of its shares outstanding. This traditional approach offers investors some attractive benefits, but it also has some potential flaws.

As a company's stock price goes up or the company issues more shares, the portfolio will hold a larger exposure to the company. If a stock's price rises relatively more than the fundamental value of the company, the result can be a portfolio that holds relatively more overvalued stocks than undervalued stocks. Investor behavior often creates an increase in price volatility thus driving the gap between price and fundamentals further apart and increasing concentration risk at the sector, country, and/or stock level.

In contrast, a fundamental weighting approach uses measures of company size—namely, sales, cash flow, dividends, and book value—to sever the link between price (market capitalization) and portfolio weight. It then methodically contra-trades when prices deviate from fundamentals, selling when stock prices have rallied and buying when they are out of favor. A rebalancing premium is generated from systematically buying low and selling high.

Notice the big if in the discussion of the flaw: that the stock price rises relatively more than the fundamental value of the company. However, the value of the company is never specified. How do we know that it is not the valuation model as opposed to the stock price relative to the "true" fundamental value, the one variable that is out of line?

The case for a Market Capitalization Index

One way to illustrate our reservations about the fundamentally weighted indices methodology is to consider the overall general equilibrium market clearing conditions. As a company's stock price goes up or the company issues more shares, the total market value of the company will be the product of the number of shares outstanding and its price per share. Extending the analysis to an individual market, say the S&P 500, the total value of the market consists of the sum of the value of the individual issues in that market. If the market consists of liquid assets, it will be relatively easy to develop a security that replicates the returns generated by the overall market, in this case the S&P 500. Let's imagine a large cap ETF.

All one needs to do is buy the securities in proportion to their market capitalization. When the demand for the ETF increases, all the issuer must do is buy the stocks in the market in proportion to their market capitalization. Next, let's assume that the demand for the newly issued ETF increases and reaches 1% of the combined value of the stocks in the S&P 500. This means that the ETF will own 1% of each of the stocks in the S&P 500. As the popularity for the security rises, so will the ownership. Say at 95% of the market, the security will own 95% of each of the outstanding stocks. Since the ownership of each stock increases by the same proportion, the relative ownership of each individual stock as a percent of the stocks outstanding remains unchanged as the ETF ownership of the overall market rises.

Market cap insures that the percentage ownership is the same across each of the securities at every point in time. Hence in the aggregate, the expansion or increased popularity of the ETF will have no impact on the relative valuation of the individual stocks. That is, it will not create any differential demand and thus price pressure for any of the stocks in question.

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Next let's perform the same exercise for a large cap fundamentally weighted index based on the stocks in the S&P 500. We know that some securities will have higher weights in the fundamentally weighted index relative to the capitalization weighted index and vice versa. However, now as one buys the equivalent of 1% of the overall market cap, the fundamentally weighted index will buy more than 1% of the stocks with a higher weight in the fundamental index than their corresponding weight in the S&P 500. This means that as expenditures are increased as a share of the total market capitalization, eventually the fundamentally weighted index will buy 100% of the stock with the highest weight in its index. That is, as the fundamentally weighted index will reach capacity on the stocks with a weight higher than those of the S&P 500 much faster than those with a lower weight than the cap weighted index.

As the fundamentally weighted index increases in market share, the demand for the fundamentally over-weighted stocks increases relative to that of the fundamentally under-weighted stocks. The market will also experience excess demand for the stocks with the higher weight relative to the cap weighted index and excess supply for the stocks with the lower weight relative to the cap weighted index. If the market is to clear, prices will have to adjust. A general equilibrium market clearing condition requires that the price of the stocks for which there is an excess demand, the fundamentally over-weighted, has to rise. Similarly, the stocks for which there is an excess supply, the fundamentally underweighted, the price must fall.

In a general equilibrium setting we know that the fundamentally weighted index must converge to the capitalization weighted index. Thus, if there is a manager that is using a fundamentally weighted index that diverges from the market cap, there has to be other managers holding the remaining stocks in the index not being held by the fundamentally weighted index. This generates an excess demand for the fundamentally over-weighted stocks and an excess supply for the fundamentally under-weighted stocks. Equilibrium requires a change in the absolute and relative price of the stocks. The price of the fundamentally over weighted stocks increases while the price of the fundamentally underweighted stocks declines. The net effect being an increase in the market cap of the fundamentally over weighted stocks and a decline in the market cap of the fundamentally underweighted stocks. Once equilibrium is restored, the fundamentally weighted index and the market capitalization weighted index become one and the same.

This analysis leads to a very important insight: In a general equilibrium context, the limiting conditions are very precise: all the securities must be held in proportion to their market capitalization, and that is only possible when the two indices are the same. Under these conditions inefficiency will be arbitraged away, and it will disappear. If there are no transaction costs, the inefficiency should not persist, and the two indices must converge instantaneously. Therefore, the all-encompassing, relevant, and appropriate index is the cap weighted index, not the fundamentally weighted index.