Fundamental indexing around the world

Christian Walkshäusl *, Sebastian Lobe

University of Regensburg, Center of Finance, Universitätsstraße 31, 93053 Regensburg, Germany

ARTICLE INFO

ABSTRACT

Using an international sample from 1982 to 2008, we investigate the performance of global and 50 country-specific (28 developed and 22 emerging) fundamentally weighted portfolios compared to capitalization-weighted portfolios. First, we establish that superior performance of domestic portfolios diminishes considerably when applying a bootstrap procedure for robust performance testing. Second, after controlling for data snooping biases and the value premium, we find evidence of outperforming global fundamental indexes, but no compelling evidence of outperforming country-specific indexes.

© 2010 Elsevier Inc. All rights reserved.

"It's a triumph of marketing, and not of new ideas. It's a repackaging of old ideas. […] The academics have been well aware of these issues for 15 years. It's just value vs. growth."
Fama and French (2007)

"The development of fundamentally indexed portfolios may offer an answer to some of the deficiencies of capitalization-weighted indexes."
Siegel (2007)

1. Introduction

The standard for weighting is the market capitalization-weighted portfolio: a portfolio that weights each component by its stock price multiplied by its common shares outstanding. This methodology has strong appeal since the return of these portfolios represents the aggregated average market return to all shareholders. However, one essential question is ordinarily overlooked in this context: does the predominant weighting scheme for portfolios — market capitalization — really suit investor's needs? In other words: can a capitalization-weighted portfolio provide the best available risk and return relation for an investor?

This provocative concept of fundamental indexing by Arnott, Hsu and Moore (2005) has led to a new debate about this question.[1] The approach allocates capital to stocks based on the weights of metrics such as book value, cash flow, dividends, and sales.

In this paper, we provide the first comprehensive worldwide assessment of fundamental weighted portfolios on a global and country-based level applying the Ledoit and Wolf (2008) bootstrap procedures for robust performance testing and the Romano and Wolf (2005) data snooping control. In this way, we develop a fresh and careful insight to the question whether a weighting scheme based on fundamentals or market capitalization is superior. This question is important on a methodological level because researchers frequently use specifically weighted portfolios (usually, value-weighted or equal-weighted), as for example, for event studies, and performance evaluation. Also, it is well established in the literature that passive investing outperforms active investing (see, e.g. Carhart, 1997; French, 2008; Jensen, 1968; Malkiel, 1995). Thus, it is of interest whether fundamental indexes can really challenge capitalization-weighted indexes as the prevailing passive investing paradigm.

The primary theoretical rationale for the capitalization weighting scheme is rooted in the Capital Asset Pricing Model (CAPM) of Sharpe (1964), Lintner (1965), and Mossin (1966), which establishes that an investor can have no better risk and return trade-off than that available

---

* Corresponding author.
E-mail addresses: christian.walkshaeusl@wiwi.uni-regensburg.de (C. Walkshäusl), sebastian.lobe@wiwi.uni-regensburg.de (S. Lobe).

---

[1] With, for example, Jeremy Siegel as a proponent (see 'The Noisy Market Hypothesis', Wall Street Journal, June 14, 2006), and John Bogle and Burton Malkiel as opponents of fundamental indexing (see 'Turn on a Paradigm?', Wall Street Journal, June 27, 2006). For the history of fundamental indexing, see Siegel (2007).

by holding a portfolio consisting of all risky assets in the following proportion: that each asset in the market portfolio equals the market value of the asset divided by the total market value of all assets. Hence, a capitalization-weighted portfolio of all tradable securities should be mean-variance optimal. Regardless of the theoretical rationale, this inference is questionable. For example, Markowitz (2005) examines the assumptions that underlie the CAPM theory and finds several aspects that question the robustness of the expectation that a capitalization-weighted market portfolio is mean-variance optimal: when one clearly unrealistic assumption of the model is replaced by real-world constraints, this conclusion no longer holds.

Additionally, the prediction of the CAPM depends critically on market efficiency. The Efficient Market Hypothesis assumes that the price of a stock at every point in time represents the best, unbiased estimate of firm value. Hsu (2006) argues that if stocks are mispriced in the sense that they do not fully reflect firm fundamentals, the traditional capitalization weighting scheme leads to suboptimal performance. This is because underpriced stocks will have smaller capitalizations than their fair equity value, and similarly, overpriced stocks will have larger capitalizations than their fair equity value. Thus, the sub-optimality arises because capitalization weighting tends to overweight stocks whose prices are high relative to their fundamentals and underweight stocks whose prices are low relative to their fundamentals. Treynor (2005) formally demonstrates that market-valuation-indifferent portfolios are superior to capitalization-weighted portfolios because their weights do not suffer from the error in market prices. It follows that market-valuation-indifferent portfolios will mitigate the problem of overweighting overvalued stocks and underweighting undervalued stocks.

However, the theoretical superiority of market-valuation-indifferent portfolios has been questioned. Perold (2007) criticizes the theory on which fundamental indexing is based, that is, that an investor can beat the market without knowing fair value simply by avoiding the capitalization weighting scheme. If one does not know fair value, then even though prices can move toward fair value, the direction of that movement is random. He argues that if markets are inefficient, but one does not know whether a given stock is over- or undervalued, then there is no performance drag from capitalization weighting. Another way to state the preceding conclusion is in terms of the correlation of the pricing error with fair value and with market value. If a fundamentally weighted portfolio is to outperform a capitalization-weighted portfolio of the same stocks, then the fundamental variables used to construct the weights should contain more information about the fair values of the stocks than the market values of the stocks contain. Kaplan (2008) therefore develops a boundary condition that needs to be satisfied in order for a non-capitalization weighting scheme to add value: if the correlation between the fundamental values and the fair values exceeds the correlation between the market values and the fair values, then fundamental weighting is the a priori superior approach. If the reverse is true, then capitalization weighting is superior. Since fair values in these inequalities are not observable, one can only evaluate the historical performance to see whether fundamental weighting or capitalization weighting is the better way of investing.[2]

Previous empirical research on fundamental weighted portfolios can be categorized into three groups: alternative inference of fundamental values without using accounting data, re-weighting of originally capitalization-weighted indexes by fundamentals, and analysis of commercially available fundamental indexes.

Chen, Chen and Bassett (2007) show how to implement the idea of fundamental weighted portfolios without directly measuring funda-

mental values. They are indeed influenced by Arnott, Hsu, and Moore (2005), but the estimation of fundamental weights based on accounting data is thereby replaced by a smoothed average of traditional capitalization-weights. Assuming that market prices are unbiased, but noisy approximations for fundamentals, they find an outperformance over the traditional capitalization-weighted portfolio on the U.S. market by about one percent a year.

Arnott, Hsu, and Moore (2005) are further supported by Hemminki and Puttonen (2008), who re-weight the constituents of the Dow Jones Euro Stoxx 50 by fundamentals, as well as by Stotz, Döhnert, and Wanzenried (2007), who perform a similar study for the broader European stock market index, the Dow Jones Stoxx 600. Estrada (2008) concludes that investors willing to abandon capitalization-weighted indexes in favor of other alternatives should look into traditional value (particularly, dividend-yield-weighted) strategies, which seem to outperform fundamental indexing (hence, price-unrelated) strategies.

Using the Fama and French (1993) three-factor model, Jun and Malkiel (2008) assess the performance of one commercially available fundamental index, the FTSE RAFI US 1000, and show that it exhibits a significant value tilt, and that the alpha of this particular index is not statistically significantly different from zero.[3] Amenc, Goltz and Le Sourd (2009) analyze and compare the performance of commercially available fundamental indexes of seven different index providers for the U.S. market and find in most cases no significant outperformance over capitalization-weighted indexes.

In contrast to previous research, we provide in this paper the first comprehensive worldwide assessment of fundamental weighted portfolios on a global and country-based level. While prior studies in this field obtained their results generally by applying a traditional performance measurement framework, we are the first, to the best of our knowledge, to assess the performance of fundamentally weighted portfolios by applying recent bootstrap procedures for robust performance testing and data snooping control. Thus, we provide a profound insight to the question whether a weighting scheme based on fundamentals or market capitalization is superior, and hence fill an important gap in the literature.

We investigate the concept of fundamentally weighted portfolios with a broad as possible worldwide data sample of 50 developed and emerging countries expanding the focus to a global level, since previous research centered mainly on the U.S. market or European indexes. Therefore, we construct global fundamentally weighted portfolios to examine the performance of the concept in a highly diversified environment and create a domestic fundamentally weighted portfolio for each country in our sample.

Our analysis establishes the following main results. First, we find that all global fundamentally weighted versions and 46 out of 50 country-specific fundamentally weighted portfolios create higher returns than their capitalization-weighted counterparts with similar volatility. Hence, in a mean-variance sense, fundamental indexing should offer more efficient outcomes. This finding is consistent with the results of Arnott, Hsu, and Moore (2005) and Hemminki and Puttonen (2008), and Stotz, Döhnert, and Wanzenried (2007). However, none of these studies has addressed the robustness of their findings. Therefore, we subject our results to the recent bootstrap approach of Ledoit and Wolf (2008) for robust performance testing. We establish that the superior performance of global fundamentally weighted portfolios appears robust, while the superior performance of country-specific fundamentally weighted portfolios diminishes considerably.

Second, we decompose the performance in a single-factor framework, as well as by applying Fama and French's (1993) three-factor model and Carhart's (1997) four-factor model with global and country-specific self-constructed size, value and momentum factors.

---

[2] Arnott (2004) poses interesting questions which apply to fundamental indexing as well: "When theories do not agree, though, should we discard the messier one? Not if we accept the wisdom of Einstein, requiring our theories to be no simpler than necessary. If finance theory assumes that markets are efficient, and behavioral finance suggests that markets are not efficient, do we discard the less convenient theory?"

[3] Arnott, Hsu, and Moore (2005) also report an alpha of −0.1% using the same framework.