What Is Fundamental Indexation?

Passive investing is the market portfolio in market proportions. Strictly speaking, all else is active investing. Active investing incurs administrative costs and transaction costs, and it triggers taxable events. Actively managed funds must charge a fee to investors in order to cover these costs and earn a profit for their alleged value added.

Indexation refers to stock market indexes that are the basis for investable financial products. Stock equity indexes are the basis for index mutual funds, exchange-traded funds and other investable stock indexes such as derivatives.

Fund indexes require two distinct choices in their construction. First, the individual constituent securities must be selected by some criteria from a defined index-specific universe of investment opportunities. Second, the proportions or weightings of each individual constituent in the index or portfolio must be selected by some criteria. These two choices are addressed in the methodology for the management of the fund indexes.

Fundamental refers to a certain type of criterion or factor used to construct an index. The term "fundamental" requires disambiguation. The criteria that are used to select stocks and weight stocks in an index can be defined as one of three types: (1) fundamental, (2) market, and (3) hybrid, or combination of fundamental and market. For present purposes, a dichotomy between fundamental and non-fundamental types is desired, and therefore, the market criteria and the hybrid criteria can be combined into one type referred to as non-fundamental.

The fundamental criteria or factors of interest are typically firm-based and firm-generated, i.e., they are measured at the level of the individual firm. This is contrasted with so-called economic fundamentals that are measured at the level of the economy. The

market criteria or factors are market-based and market-generated, i.e., they are measured at the level of the stock market.

Fundamental indexation for common stocks refers to indexation on the basis of fundamental factors in one of three ways: (1) selection of constituent stocks on the basis of fundamental factors, (2) weighting of constituent stocks on the basis of fundamental factors, or (3) both selection and weighting of constituent stocks on the basis of fundamental factors.

The validity and significance of any given fundamental indexation in the stock market can be determined with the theories of economics and econometrics. Economics is a social science. Experiments in the social sciences are often quasi-experiments instead of actual experiments, because ethical considerations prevent actual testing on human subjects. In scientific studies in the field of economics, hypotheses are tested using econometrics. Econometrics is a method of causal inference applied to economics.

When an explanatory variable or factor in an econometrics model equation is a group of stocks or portfolio, then the operational definition of the portfolio-based factor entails indexation because it requires specification of the methodology for selecting the constituent stocks and for weighting the constituent stocks. For example, the capital asset pricing model (CAPM) is based on the stock market portfolio, and the proxy for the stock market portfolio is usually the capitalization-weighted S&P 500 common stock index. The Three-Factor Model of return has three portfolio-based explanatory factors: (1) a proxy portfolio to measure the stock market portfolio factor, (2) a spread between two portfolios to measure the size-related factor, and (3) a spread between two portfolios to measure the value-related factor, where value is defined as book-to-market equity ratio.

Investable indexes based on the size- and value-related factors of the Three-Factor Model may have a methodology of index management that specifies capitalization-weighted, equal-weighted or other metric-weighted constituents in their portfolios.

A stock screen, filter, criterion or factor can be tested by an equivalent explanatory variable in an econometric model of expected total return. For any given such variable, there are three questions to ask, and the three questions follow a logical order.

First: Validity. If a portfolio-based explanatory variable or factor in an econometric model is a circular simultaneity, then the model is neither logically valid nor scientifically valid. An invalid factor must be rejected and discarded.

Second: Significance. If there is no circular simultaneity or other fatal fallacy in the econometric model, then the portfolio-based explanatory factor in the valid model may or may not be statistically significant at conventional levels of probability. If an explanatory factor is not statistically significant according to tests based on scientific research methodology, then it is rejected. If a portfolio-based factor in a valid econometric model is statistically significant according to tests based on scientific research methodology, the factor is said to be "priced," which is why econometric models of return are sometimes called pricing models.

Third: Power. If the portfolio-based factor in a valid econometric model is priced according to tests based on scientific research methodology, then it may or may not have high explanatory power, as measured by the coefficient of determination or R^2 statistic. The possible values of R^2 range from a low of zero for no explanatory power to a high of 100% for total explanatory power.

The R^2 values of about 40% to 50% reported for the conventional CAPM are valid but not high enough to provide many profitable investment opportunities. In contrast, the R^2 values from a low of 83% to a high of 97% reported for the Three-Factor Model of return [Fama and French (1993, Table 6, p. 25)] are high but not valid because they are spuriously induced. The Three-Factor Model of return is irremediably, materially, fatally flawed due to multiple instantiations of vicious circular reasoning in the form of econometric circular simultaneity, which are serious deviations from standard, generally accepted, scientific, research methodological practices. The cited article by Fama and French is neither scientifically interesting nor important. Likewise, the study presented in Arnott, Hsu and Moore (2005) is fatally flawed due to econometric circular simultaneity in the capitalization-indifferent dividends factor. As a result of this fatal fallacy, the research is neither scientifically interesting nor important.

In summary, a factor that is alleged to scientifically describe or explain stock returns, i.e., to be priced in the econometric sense as with the CAPM, must satisfactorily answer three questions: first, Is it valid? second, Is it significant? and third, Is it powerful?

If a given factor is not valid, then an index fund based on the factor is a hoax. If a given factor is not significant, then an index fund based on the factor is a hoax. In neither case can a premium fee be justified for the management of such an index fund because no premium expected return is earned on average in the long run.

If a factor is valid and significant but not powerful enough to explain a majority of the variation in expected return, then it is not a hoax, but it may be an economic waste unless it can more than compensate for market frictions caused by portfolio turnover, transaction costs, management fees and other expenses.

ANNOTATED REFERENCES

Arnott, Robert D., Jason C. Hsu and Philip Moore, 2005, "Fundamental indexation", *Financial Analysts Journal* 61:2 (March/April), 83-99.
http://papers.ssrn.com/sol3/papers.cfm?abstract_id=713865.

Abstract: A trillion-dollar industry is based on investing in or benchmarking to capitalization-weighted indexes, even though the finance literature rejects the mean-variance efficiency of such indexes. This study investigates whether stock market indexes based on an array of cap-indifferent measures of company size are more mean-variance efficient than those based on market cap. These fundamental indexes were found to deliver consistent, significant benefits relative to standard cap-weighted indexes. The true importance of the difference may have been best noted by Benjamin Graham: In the short run, the market is a voting machine, but in the long run, it is a weighing machine.

Keywords: Investment Theory, Portfolio Theory, Portfolio Management, Equity Strategies, Performance Measurement and Evaluation, Performance Measurement, Equity Investments, Fundamental Analysis and Valuation Models

Robert D. Arnott	Research Affiliates, LLC
Jason C. Hsu	Research Affiliates, LLC
	Merage School of Business, UC Irvine
Philip Moore	Pacific Investment Consultants

Campbell, John Y., Andrew W. Lo and A. Craig MacKinlay, *The Econometrics of Financial Markets*, 1997, Princeton University Press. This textbook briefly covers the Fama-French Three-Factor Model of expected total return for stock-portfolio pricing, but the model is not listed in the index. Fama and French (1993, *Journal of Financial Economics*), notwithstanding its econometric circular simultaneities in the return models and in the *ad hoc* split-sample diagnostic test of the Three-Factor Model of return, is cited favorably with approval on pages 211, 212, 240, 241, 248 and 249.

Fama, Eugene F., and Kenneth R. French, 1993, "Common risk factors in the returns of stocks and bonds", *Journal of Financial Economics* 33:1, 3-56.

Abstract excerpt: This paper identifies five common risk factors in the returns on stocks and bonds. There are three stock-market factors: an overall market factor and factors related to firm size and book-to-market equity. There are two bond-market factors, related to maturity and default risks. … Most important, the five factors seem to explain average returns on stocks and bonds.

http://www.nes.ru/~agoriaev/Papers/Fama-French%205%20factors%20for%20stocks%20and%20vonds%20JFE93.pdf