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Robert Merton on SUSTAINABLE SOURCES OF ALPHA

Nobel Prize laureate Robert Merton of Black-Scholes option pricing model fame spoke to CFA Singapore members on 23 October at Capital Towers.

The renowned financial engineer addressed practical considerations when running financial models using 'Alpha' to generate excess returns.

In the search for maximum return and minimum risk, fund managers try to maximize the Sharpe Ratio, which is the excess return of the portfolio over the risk-free rate divided by the portfolio's standard deviation.

They also rely on the Capital Asset Pricing Model $R_a = R_f + \beta(R_m - R_f)$, where the expected return on a risky asset is conceptualized as risk-free return (expressed as R_f), systematic risk (expressed as Beta, or β) and market risk premium (expressed as $R_m - R_f$).

Professor Merton points out that in the real world, there are risks other than empirical risks.

These risks are important because they systematically affect prices.

One example is the interest rate exposure faced by a retiree. If interest rates are around 4% to 5%, a retiree with one million dollars in savings deposit gets \$40,000 to \$50,000 a year.

He will prefer to lock in his income at this rate because he doesn't want to worry about his interest income dwindling to only \$1,500 a year should interest rates come down to only 15 basis points.

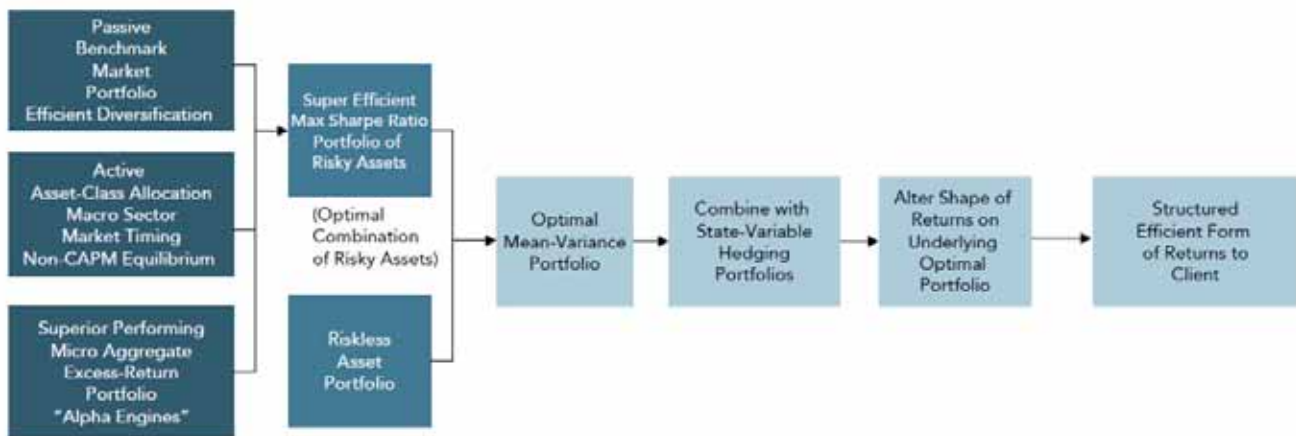
Applied to regression analysis on market data, the model becomes the following equation where additional return above the expected return is expressed as α (Alpha).

$$R_i - R_f = \alpha_i + \beta(R_m - R_f) + \epsilon_i$$

In an efficient market of perfect information flow, Alpha is zero, but in the real world, active managers may capture returns in excess of the expected return for the risk assumed ($\text{Alpha} > 0$) and vice versa.

In the investment management process (see chart), a fund manager constructs a portfolio of risky assets that maximize the Sharpe Ratio.

Stages of Production Process for a Given Investment Goal



Source: Robert Merton, Dimensional Fund Advisors

He then uses derivatives to alter the shape of returns on the underlying optimal portfolio according to customer preferences.

In theory, there are different ways to get risk exposure: cash, swaps, etc. In reality, individual investors have different preferences, such as in tax and liquidity requirements.

These individual differences give rise to 'Alpha', which is traditionally accepted as coming from information inefficiency and market friction.

If the CAPM does not hold for the investment in respect to the information that you have, then you can always prove that 'Alpha' exists.

There are two categories of what Professor Merton refers to as 'traditional sources of Alpha':

(1) Macro, or sector asset allocation strategies which involves market timing, or when the CAPM is not a description of a market equilibrium model

(2) Micro 'excess returns', e.g. funds using risk arbitrage hedging, technical analysis, fundamental analysis, foreign currency forecast, private equity, etc.

Here, the optimal portfolio of risky assets is a combination of the asset market portfolio, asset allocation macro, and micro 'Alphas'. To generate traditional Alphas, the fund manager needs faster, smarter, better models or better information inputs.

However, Mr Merton points out there are other sources of excess returns: 'Financial Services Alpha' and 'Dimensional Alpha'.

Financial Services Alpha

Through strategic analysis of the financial services functions served by institutions, one can uncover an institution's comparative advantages, or its 'Financial Services Alpha'.

Price of purchase, tax, accounting, inability to borrow at rates that one can lend for, and leverage restrictions can vary with the investor's status.

For example, an individual investor would not be able to borrow at rates that the mega institutions can.

Some institutions are subject to rules imposed by governments, such as restriction to holding only investment grade bonds.



ROBERT MERTON

Robert C. Merton is the School of Management Distinguished Professor of Finance at the MIT Sloan School of Management and University Professor Emeritus at Harvard University.

He was the George Fisher Baker Professor of Business Administration (1988- 98) and the John and Natty McArthur University Professor (1998-2010) at Harvard Business School. Merton served on the finance faculty of MIT's Sloan School of Management until 1988.

He is currently Resident Scientist at Dimensional Fund Advisors, where he is the developer of Managed DC, an integrated retirement-funding solution system with global application that addresses the deficiencies associated with traditional defined-benefit and defined-contribution pension plans.

He served as an independent director on the boards of the Dimensional Funds from 2003-2009. Merton received the Alfred Nobel Memorial Prize in Economic Sciences in 1997 for a new method to determine the value of derivatives.

Highly skilled professionals can identify which rigidities are binding; diagnose which security prices are impacted by the rigidities; devise an efficient trading strategy to provide "the other side" of the trade to alleviate the impact of the rigidity on affected institutions; and earn an intermediation fee in the form of the excess return on the strategy.

Other helpful but non-essential advantages that contribute to the likelihood of finding 'Financial Services Alpha': strong credit worthiness, long investment horizon, flexible liquidity needs, having a large pool of assets, reputation capital, and sponsorship value.

Dimensional Alpha

In the CAPM equilibrium, the market portfolio is the optimal combination of risky assets (OCRA) for mean-variance investors, who hold the same risky portfolio of assets.

However, in more complete equilibrium models, investors use securities to hedge other dimensions of risk in addition to the overall market risk.

This is illustrated in the example of the retiree who wants to avoid interest rate exposure.

So, investors will generally not hold the same proportions of risky assets, and thus the market portfolio will not be mean-variance efficient (OCRA), and the CAPM will not explain the full story.

This means the existence of "Alphas" relative to the passive market benchmark is entirely consistent with perfect-market and efficient-market conditions.

These 'Alphas' are sustainable in the long run because these are risks that, on balance, investors are willing to pay a risk premium to avoid.

Professor Merton refers to 'Alphas' from identified dimensions of risk with risk premiums as 'Dimensional Alphas'.

The theoretical structure of such investment models will have more than one alpha and more than one beta.

A Fama-French study showed there are empirical dimensions of risk premiums from how developed the financial market was, the size of market capitalization of the stock and fundamental factors such as book to market equity.