



ANALYTICS INVESTMENT ADVISORS, LLC

Capital Asset Pricing Model

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What?

- The Capital Asset Pricing Model (CAPM) is used to determine a theoretically appropriate required rate of return.
- This model takes into consideration: 1) a portfolio's sensitivity to non-diversifiable (systematic or market) risk and is represented by Beta (β); and, 2) calculates the risk premium, or marginal return investors should expect to receive by taking additional risk; i.e., Alpha, (α).
- The CAPM was introduced by Jack Treynor (1961, 1962), William Sharpe (1964), John Lintner (1965) and Jan Mossin (1966), all independently building on the work of Harry Markowitz. Sharpe, Markowitz and Merton Miller jointly received the Nobel Memorial Prize in Economics in 1990 for their contribution to the field of financial economics.

Why?

- One must consider risk when making judgement about portfolio performance.
- Differences in risk will cause portfolios to respond differently to the overall market, the magnitude and composition of which needs to be understood when measuring performance.
- While systematic risk cannot be diversified away, unsystematic risk; i.e., risk associated with individual assets can be broadened by including a greater number of assets in a portfolio or strategic allocation.

How?

- There are four common risk adjusted measures of performance; Alpha, Beta, Coefficient of Determination and Standard Deviation, all of which can be calculated directly from monthly observations of a portfolio's time weighted returns (TWR) and the corresponding benchmark rate of return (S&P 500 in the example of the following page).
- Twelve months of individual portfolio or strategic allocations is generally sufficient to generate statistically significant results, and is preferable to longer time periods (3 to 5 years as typically published) due to the more current and relevant nature of the data.
- Rolling twelve month calculation of these risk adjusted measures of performance allows easy and continuous monitoring of client portfolios, and thus, the ability to adjust allocations according to established risk profiles as market conditions dictate.

Exchange Traded Fund Investment Model

The investment strategies below are comprised entirely of Exchange Traded Funds (ETFs) which: 1) are a way to combine the potentially high returns of individual stock trading with the benefits of diversification of mutual funds; 2) are a basket of stocks that trade on an exchange with the simplicity and liquidity of an individual stock; 3) add flexibility and safety through diversification, access to varied markets; 4) are low cost and tax efficient; 5) trade under the jurisdiction of the Security and Exchange Commission offering protection and liquidity for orderly and continuous trading; and, 6) allow the ability to effectively monitor performance and effectuate sound risk management strategies; for example, stop and limit orders.

Performance Summary

	2013*	2014*	Year-to-Date* -----12/31/2015-----					
				AUM	Alpha	Beta	R ²	SD
S&P 500	29.60%	12.55%	-0.73%					
Barclay US TR	-2.02%	5.97%	0.55%					
Cautious	32.73%	9.01%	-6.72%	<1%	-2.42	1.31	.45	5.94
Moderate	35.85%	12.92%	0.03%	30%	2.82	1.34	.87	4.32
Assertive 1	38.40%	16.90%	2.85%	32%	4.67	1.39	.84	5.24
Assertive 2	44.93%	24.83%	3.56%	26%	5.65	1.63	.70	5.93
Aggressive	68.62%	2.07%	6.20%	11%	7.42	2.78	.84	10.49

Alpha Difference between portfolio actual return and expected return.

Beta Expected change in portfolio returns per 1% change in the market index return.

R² Regression coefficient; percentage of variation in the regression equation explained by the independent variable.

SD Standard deviation; dependent variable.

