Researchers have found that much of the difference in diversified stock-fund returns can be explained by systematic risk exposures ("factors") though active decisions and randomness can still matter. The three risk factors are:

- Exposure to the stock market itself, which is riskier than safe bonds or cash.
- Exposure to small company stocks, which are riskier than those of large companies.
- Exposure to value (cheap) stocks, which are riskier than growth (expensive) stocks.

This is known as the Fama-French Three Factor Model. Using this model and statistical software at Portfolio Visualizer (see factor regression) we can determine if we're getting our money's worth from an actively managed mutual fund.

Here's an example using Fidelity's Magellan Fund (FMAGX) which costs 0.56%. The fund had a 13.93% annualized return from Jan '16 through Nov '25. Below is the output from Portfolio Visualizer.

Fidelity Magellan (FMAGX) Regression

Factor	Loading	t-stat	p-value
Market (Rm-Rf)	1.03	42.946	0.000
Size (SMB)	-0.19	-4.675	0.000
Value (HML)	-0.24	-8.859	0.000
Alpha (α)	-12.73bps	-1.186	0.238
Annualized Alpha (α)	-1.53%		

This regression analysis compares the monthly returns of Magellan to those of the risk factor portfolios. "Market" is the return of the market minus the risk free (Rf) rate (typically one month U.S. Treasury bills. "Size" is the return on small company stocks minus the return on big company stocks (small minus big-SMB). "Value" is the return on cheap stocks (high book value to market value ratio) minus the return on expensive (low book to market value) or high minus low (HML).

Magellan has a market loading of 1.03 which implies that if the market goes up or down, Magellan will do the same x 1.03. The size and value loading tells us that the fund invests in large company growth stocks.

Given that we now know the funds factor exposures we can determine how much better or worse the fund performed compared to investing in a hypothetical portfolio with the same factor exposures. This is expressed as Alpha. Given Magellan's market, size, and value exposures, its average return was about 1.5% per year lower than what the Fama–French 3-

factor model would have predicted. However, the p-value tells us that difference is not statistically meaningful, and the results are consistent with the manager neither adding nor detracting value relative to its benchmark.

It's very frequently the case that actively managed mutual funds underperform low-cost index funds. Over this period, Magellan exhibited a large cap growth profile. An investor would have been better off in Vanguard's low cost Large Cap Growth Index fund (VUG) which returned an annualized 17.7% over the same period.

Here's a case of statistically significant negative alpha.

SEI Tax-Managed Large Cap F (SIMT)

Ticker	TMLCX			
Time Period	Jan 2016 - Oct 2025			
Regression Basis	118 monthly samples			
Coefficient of Determination (R^2)	96.9%			
Adjusted R^2	96.9%			
Regression F statistic	1,207.90 (p-value = 0.000)			
Autocorrelation	No autocorrelation confirmed (Durbin-Watson test value is 2.137 with p-value 0.			
Heteroscedasticity	No heteroscedasticity confirmed (Breusch-Pagan test value is 7.693 with p-valu			
Factor	**Loading**	**Standard Error**	**t-stat**	**p-value**
Market (Rm-Rf)	0.95	0.017	57.075	0.000
Size (SMB)	-0.09	0.027	-3.242	0.002
Value (HML)	0.15	0.019	8.179	0.000
Alpha (α)	-17.62bps	0.001	-2.375	0.019
Annualized Alpha (α)	-2.11%			

The fund underperformed its benchmark by a statistically significant 2.11% per year. This may be partly due to its high expense ratio of 0.89%. Returns are reported net of expenses but not taxes. This fund claims to be tax managed, but Morningstar estimates a tax cost ratio (lost to taxes) of 1.11% annually. A passively managed index fund would be expected to lose 0.6% annually to taxes.

Statistically significant positive alpha is extremely rare and rarely persistent. This may explain the enormous flow out of actively managed funds and into passive. In '24 the amount invested in passively managed mutual funds and ETFs surpassed the amount invested in active funds for the first time. C Ryan, CFP®