

ECON106V LAB #6

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Calculate Beta & Alpha

Size Portfolios	Lo 10	Dec 2	Dec 3	Dec 4	Dec 5
Beta	1.40659944	1.383069469	1.322726088	1.260884706	1.227022823
Alpha	0.1429530688	0.05113495786	0.07265122624	0.07302463362	0.05627592111
Expected Return	1.38600349	1.277870855	1.257547993	1.21504363	1.174816754

Size Portfolios	Dec 6	Dec 7	Dec 8	Dec 9	Hi 10
Beta	1.203611482	1.151962931	1.111987125	1.062376843	0.931576667
Alpha	0.07681883839	0.05317041377	0.05676027071	0.02107033851	0.004605420565
Expected Return	1.1791274	1.119668412	1.095541012	1.025453752	0.9182984293

Calculate Beta & Alpha

BMT Portfolios	Lo 10	Dec 2	Dec 3	Dec 4	Dec 5
Beta	1.009272979	0.9500683998	0.9684143788	1.048585035	0.9940000729
Alpha	-0.05205769967	0.08215938121	0.05995401649	-0.05302329618	0.05160333511
Expected Return	0.9155061082	1.008673647	0.9991884817	0.9417975567	1.008577661

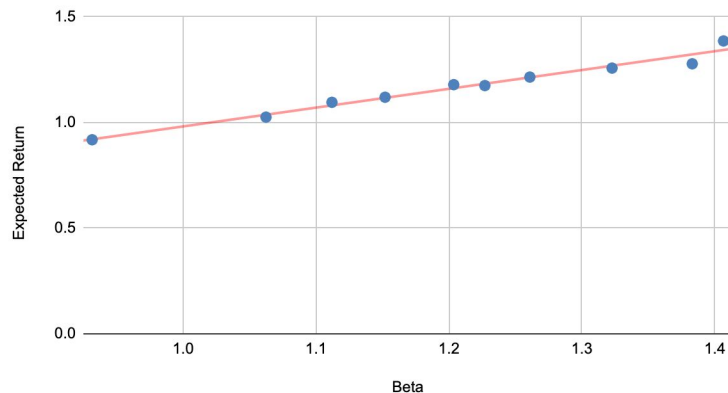
BMT Portfolios	Dec 6	Dec 7	Dec 8	Dec 9	Hi 10
Beta	1.038839715	1.095551485	1.150071893	1.274976835	1.455741567
Alpha	0.08888197158	-0.04536064513	0.1351185649	0.1762817684	0.05845276269
Expected Return	1.076945899	0.9820244328	1.20030541	1.328071553	1.335575916

Calculate Beta & Alpha

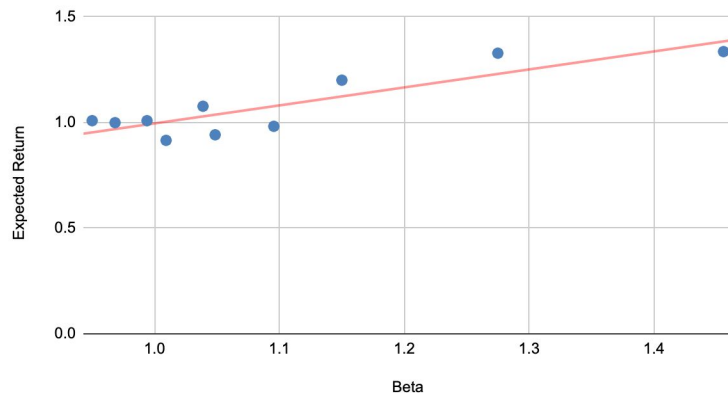
The Security Market Line (SML) appears to hold to a reasonable level of approximation. It can be seen that the *plotted points* are very close to the SML.

Compared to the Security Market Line (SML) of individual stocks, the SML of Portfolios appear to be a better approximation of the 'Expected Returns,' given 'Beta.' There is a general trend in both datasets (dataset from prior week vs dataset from current week) that a higher beta value is correlated with a higher expected return.

Size Portfolios: Expected Return vs. Beta



BTM Portfolios: Expected Return vs. Beta



Systematic and Idiosyncratic Volatility

Size Portfolios	Lo 10	Dec 2	Dec 3	Dec 4	Dec 5
Idiosyncratic Error	9.810507849	8.696818582	7.917587291	7.425527879	7.023845021
Size Portfolios	Dec 6	Dec 7	Dec 8	Dec 9	Hi 10
Idiosyncratic Error	6.770171808	6.413064377	6.107437254	5.776198844	5.037402065

BMT Portfolios	Lo 10	Dec 2	Dec 3	Dec 4	Dec 5
Idiosyncratic Error	5.669152949	5.297387977	5.378626149	5.895222189	5.615359409
BMT Portfolios	Dec 6	Dec 7	Dec 8	Dec 9	Hi 10
Idiosyncratic Error	6.027063389	6.388476525	6.754834647	7.638338865	9.120296637

The idiosyncratic volatility is higher than for the individual stocks from the prior week. A higher idiosyncratic volatility does not necessarily mean a better picture of the Security Market Line. The SML is a graphical representation of the relationship between expected return and risk for a well-diversified portfolio of securities, where risk is typically measured by the systematic or market risk of the securities. While idiosyncratic volatility can be informative for understanding the risk profile of individual securities, it is not directly related to the SML. The SML is primarily concerned with systematic risk, which is the risk that is common to all securities in the market and cannot be diversified away.

The “Size Anomaly” and the “Value Premium”

Firms with small market capitalizations are often considered to be riskier than larger firms because they may have less diversified revenue streams and are more vulnerable to economic shocks. As a result, these firms may have higher beta values, which would lead to higher expected returns according to the CAPM model. If the expected return calculated using the CAPM model for a small-cap firm is higher than the expected return for a larger-cap firm with the same beta, then the small-cap firm may be considered a better deal according to the CAPM model.

The book-to-market (B/M) ratio is a measure of a firm's valuation based on the relationship between its book value (the value of its assets minus liabilities) and its market value (the price of its outstanding shares). Firms with high B/M ratios are often referred to as "value firms," as they are perceived to be undervalued by the market. One possible explanation for the value premium is that investors may underestimate the future cash flows of value firms and overestimate the future cash flows of growth firms. As a result, value firms may be undervalued by the market, leading to higher expected returns. From a CAPM perspective, firms with high B/M ratios are considered to have a higher risk premium, as they are perceived to be riskier investments. However, the CAPM model suggests that investors are compensated for bearing systematic risk, and therefore, firms with high B/M ratios may be good deals if they provide higher expected returns than similar firms with lower B/M ratios.

However, it's important to note that the CAPM model is based on several assumptions that may not hold in the actual world, and there are many other factors that can affect the value of a firm beyond its market capitalization and beta. Therefore, investors should use multiple models and factors to evaluate the value of a firm before making investment decisions.

Fama-French Alpha and Beta

Size Portfolios	Lo 10	Dec 2	Dec 3	Dec 4	Dec 5
FF Market	0.9962844845	1.067201326	1.071961632	1.045451405	1.05882988
FF SMB	1.546111863	1.275689773	1.011898014	0.8806433582	0.7266231229
FF HML	0.7520946822	0.478308604	0.3807359791	0.3137641255	0.1989201321
FF Alpha	-0.1308882542	-0.1426977912	-0.08140119503	-0.05707519791	-0.03753163454
ER Market	1.38600349	1.277870855	1.257547993	1.21504363	1.174816754

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The Fama-French three-factor model argues that the cross-sectional variation in stock returns can be explained by the following factors:

1. Market risk factor: This factor is represented by the excess return of the market portfolio over the risk-free rate of return. The market factor represents the common exposure to market-wide shocks that affect all stocks, regardless of their characteristics.
2. Size factor: This factor represents the outperformance of small-cap stocks over large-cap stocks. Small-cap stocks have higher expected returns than large-cap stocks, after controlling for the market risk factor.
3. Value factor: This factor represents the outperformance of value stocks over growth stocks. Value stocks have higher expected returns than growth stocks, after controlling for the market risk factor and size factor.

Fama-French Alpha and Beta

BMT Portfolios	Lo 10	Dec 2	Dec 3	Dec 4	Dec 5
FF Market	1.076893256	0.9820908189	0.9820631285	1.029420032	0.9660385382
FF SMB	-0.07866412374	-0.006724142762	-0.04142202752	-0.02519131739	-0.06566642894
FF HML	-0.3314172204	-0.1929059496	-0.03680612416	0.149864828	0.2527073135
FF Alpha	0.02805706193	0.1261624478	0.07105094754	-0.0851615745	-0.001028884452
ER Market	0.9155061082	1.008673647	0.9991884817	0.9417975567	1.008577661

The Fama-French three-factor model improves on CAPM by incorporating additional factors, specifically size and value, that have been shown to be significant predictors of stock returns. This model provides a more accurate and comprehensive explanation of the cross-sectional variation in stock returns, which has practical implications for investors and investment managers.

BMT Portfolios	Dec 6	Dec 7	Dec 8	Dec 9	Hi 10
FF Market	0.9797573325	1.001530663	1.019591227	1.09643289	1.180099664
FF SMB	-0.05165279844	0.03471745554	0.1241751253	0.2365336405	0.5538139533
FF HML	0.4313728281	0.5487511813	0.6720342355	0.8411124869	1.076330694
FF Alpha	-0.005028943459	-0.1715833836	-0.02495681806	-0.02952615641	-0.2218100291
ER Market	1.076945899	0.9820244328	1.20030541	1.328071553	1.335575916

Two Questions About Alphas and Betas

If you have formed a portfolio with high beta stocks and your portfolio outperforms the market in a rising market, then it is possible that you have generated alpha according to CAPM. This would mean that your portfolio has earned a return that is higher than what would be expected based on its level of systematic risk, as predicted by the CAPM. However, it is important to note that generating alpha is not a guarantee of future success, and it may be difficult to sustain alpha over the long term. In addition, there may be other factors that are not accounted for by CAPM that could explain the outperformance of your portfolio.

According to CAPM, you may not have generated alpha in scenario two because the model only considers market risk, as measured by beta, as the sole factor that drives asset returns. If your portfolio outperformed the market solely because small cap stocks and value stocks did great during that period, but the market did not, then your portfolio's outperformance may be attributed to exposure to these factors and not necessarily to generating alpha. On the other hand, the Fama-French three-factor model takes into account the size and value factors in addition to the market factor. If your portfolio is heavily weighted towards small cap stocks and value stocks and it subsequently outperformed the market due to the outperformance of these factors, then you may have generated alpha according to the Fama-French three-factor model. The model would suggest that the higher expected returns associated with these factors have compensated investors for the additional risk involved. However, it is important to note that generating alpha is not guaranteed, and past performance may not persist in the future. Additionally, there may be other factors that are not accounted for by the Fama-French three-factor model that could explain the outperformance of your portfolio. Therefore, investors should conduct further analysis and consider other relevant factors when evaluating the performance of their portfolios.