

North Street Capital Partners
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Long-Short Decile Hedge Portfolio Strategy for Alpha Dated 2/9/21

Executive summary

Aim: Finding a long-short decile hedge portfolio that generates some decent alpha relative to the Fama-French 5 factor model.

Overview: The predictor, quick ratio was constructed to estimate the expected stock returns. The portfolio was then divided into deciles by using the predictor in the bar chart. Using the chart trend, a long-short decile strategy was formed, and Fama-French 5 factor model was used to find any alphas.

Findings: The quick ratio showed a statistically significant result, 2nd decile portfolio was discovered to have the smallest mean excess returns, the 10th decile portfolio was discovered to have the highest mean excess returns and some alphas were generated using the Fama-French 5 factor model.

The predictor

The predictor calculated is a quick ratio and it's calculated by taking the difference between current asset and inventory then dividing by inventory. The quick ratio measures the company's ability to meet its short-term obligations without needing to sell its inventory. The higher the ratio, the better a company's liquidity.

Motivation

Hypothesis: I hypothesise that there is a positive correlation between earnings per share and expected stock returns.

Rationale: I have chosen the quick ratio instead of the current ratio as it is a more conservative measure assessing liquidity. Unlike the current ratio, the quick ratio ignores inventory as inventory takes time to turn into cash and it's also unreliable if a company is struggling to make sales due to external factors like competition. A high quick ratio indicates a good measure of a company's financial health and gives confidence to investors. Although, it can be argued that safer companies tend to be less risky which may result in lower expected returns. However, investors are expected to be more inclined to buy the shares which drive the share price up resulting in higher expected stock returns.

Summary Statistics

Statistic	N	Mean	St. Dev.	Min	Pct1(25)	Pct1(75)	Max
predictor	251,764	1.366	1.522	0.0003	0.735	1.512	95.379
erret	251,764	0.011	0.111	-0.983	-0.046	0.063	3.331
act	251,695	1,796.903	3,862.635	0.056	284.046	1,685.900	85,963.000
inv	251,735	499.202	1,206.485	0.000	41.942	473.779	49,780.000
lct	251,713	1,367.078	3,175.331	0.116	166.300	1,221.254	61,800.000

As shown above, it lists observations, standard deviations, min, max and mean of all variables used to construct the quick ratio (predictor) including the predictor. The observations are all different as not all companies have inventories or current assets, it will depend on the nature of the business and sector.

Act variable represents the current asset with a mean of 1,797 (millions in USD), and Lct variable represents the current liability with a mean of 1,367 (millions in USD). It makes sense as companies tend to have higher assets than their liability. Invt variable represents the inventory (millions in USD) and it ranges from 0 to 49,780. It is expected as some firms provide services instead of goods and some firms focus on selling goods. Eret variable represents the excess return (stock return - risk-free rate) which is denoted in percentage, so the decimals and the range are reasonable. This is because investors can make gains or losses in stocks. The mean of 0.011 means that stocks monthly excess return is 1.1% and standard deviation of 11.1% which is lower than the predictor.

Due to the above reasons mentioned, all the values are reasonable.

Panel Data Predictability

t test of coefficients:

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              Estimate Std. Error t value Pr(>|t|)
(Intercept) 0.00963915 0.00035141 27.4296 < 2.2e-16 ***
predictor    0.00094338 0.00022753  4.1461 3.383e-05 ***
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signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

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We have conducted a t-test. We can see that both the intercept and the predictor for the OLS regression of next month stock returns are statistically significant (p-value ≈ 0 , p-value = 3.383×10^{-5} respectively).

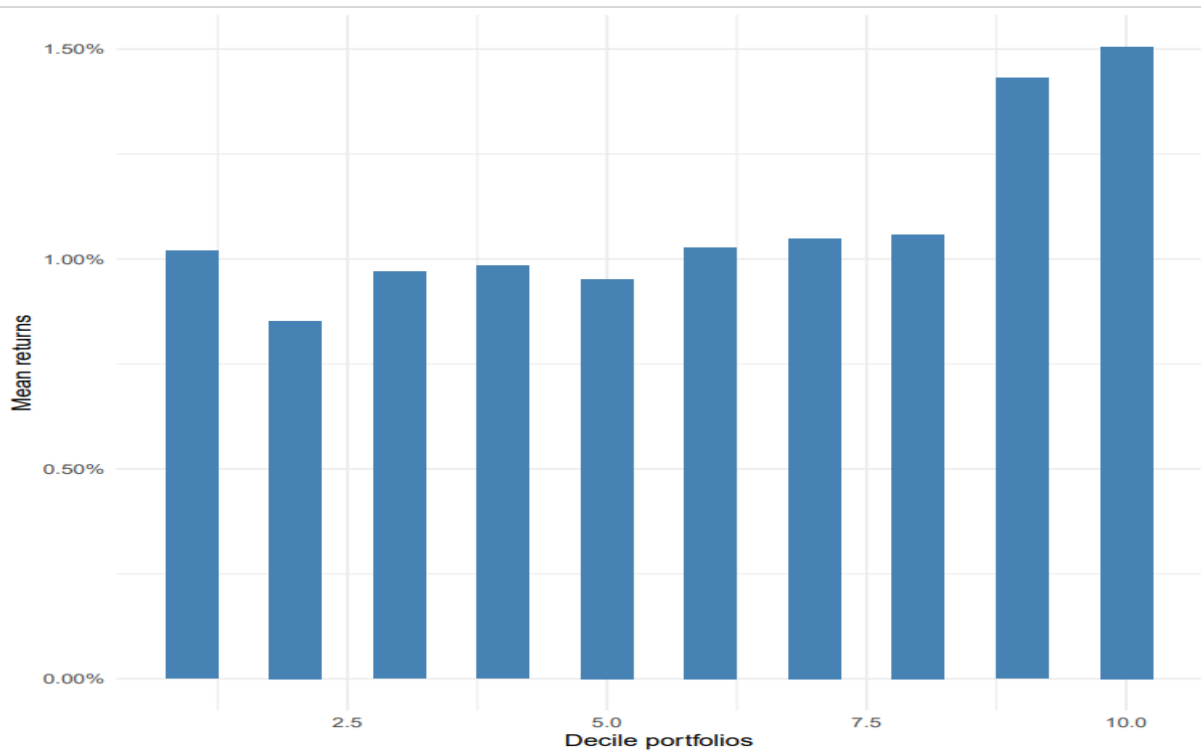
The intercept shows an estimated magnitude of 0.01 (2dp) and it represents the component of stock returns per month that cannot be explained by the risk factor of the predictor.

The predictor shows an estimated magnitude of 0.001 (3dp) and it represents the positive relationship between the predictor and expected stock return. This means that every increase of 1 in the quick ratio is associated with an increase in the mean monthly expected stock return by 0.1%.

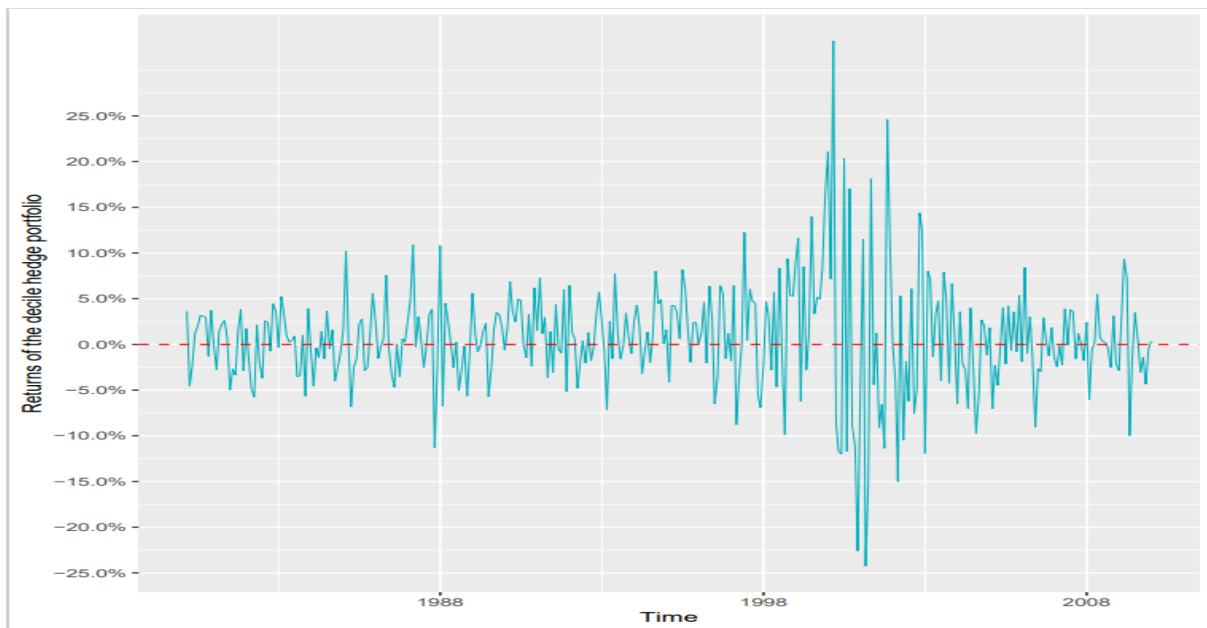
These results are consistent with the theoretical argument as an increase in the quick ratio is associated with an increase in the mean of expected stock return.

Strategy Performance

We can observe that there is an overall positive trend from the 1st decile portfolio to the 10th decile portfolio in the bar chart. There is a slight drop in mean returns in the 2nd portfolio and from the 2nd portfolio till the last, we can see a much clear positive trend.



Using the decile portfolio trend, we can form a long-short strategy by longing the 10th decile portfolio which has the highest mean return and shorting the 2nd decile portfolio which has the smallest mean return.



We can observe the time series that shows returns of the decile hedge portfolio which ranges from the start of 1980 till the end of 2009. Although the plot is messy, we can see most of the time the returns of the hedge portfolio are positive rather than negative. This means that the long-short decile portfolio is profitable over time. For positive returns, it ranges from 0% to 5% and for negative returns, it also ranges from -5% to 0%. We can see the portfolio return peak has reached over 30% whereas the portfolio loss has dropped to -25% which shows that the strategy must not be taken lightly for risk-averse investors.

Strategy Alpha

Results

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Dependent variable:				

	(1)	(2)	(3)	(4)

MktRF		0.616*** t = 4.886	0.300*** t = 5.296	0.177*** t = 3.721
SMB			0.406*** t = 3.882	0.130* t = 1.921
HML			-1.140*** t = -8.621	-0.923*** t = -10.179
RMW				-0.944*** t = -11.139
CMA				-0.221 t = -1.518
Constant	0.007* t = 1.949	0.003 t = 0.985	0.009*** t = 3.670	0.014*** t = 7.077
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Note: *p<0.1; **p<0.05; ***p<0.01				

We can see that the hedge portfolio's mean excess return is 0.7% from column 1. Alphas against CAPM is 0.3%, alpha against FF3 is 0.9% and alpha against FF5 is 1.4%. Only the alpha against CAPM is not statistically significant whereas, the alphas against FF3 and FF5 are statistically significant. The alphas represent the excess return per month that cannot be explained by the risk factor in the model. Furthermore, we notice that when compared to benchmarks like FF3 and FF5 the alpha increases to 0.9% and 1.4% respectively which indicates that the long-short portfolio is performing well. The alpha of excess return of hedge portfolio is explained better by 3 factors than 5 factors. This is because firms with a high quick ratio tend to be in the technology, healthcare, or finance industry sector as their business model is to provide services. The addition of 2 factors RMW, and CMA does not explain the returns better as small tech companies might have different profitability and investment strategy as opposed to small finance or health care companies. Therefore, the smaller alpha value in the 3-factor model can be sought as reasonable.

Loadings on FF5 (MktRF, SMB, HML, RMW, CMA):

MktRF: The beta for Market risk premium (MktRF) is positive with a magnitude of 0.177. This means that for every increase of 1 in market risk premium is associated with an increase in the mean monthly excess return of the hedge portfolio by 0.177. The portfolio is exposed to the market, so it moves in the same direction as the market.

SMB: The beta for small minus big (SMB) is positive with a magnitude of 0.130. This means that for every increase of 1 in market risk premium is associated with an increase in the mean monthly excess return of the hedge portfolio by 0.130. The portfolio is sensitive to the smaller size of the firm resulting in higher returns from smaller companies than bigger companies.

HML: The beta for high minus low (HML) is negative with a magnitude of 0.923. This means that for every increase of 1 in market risk premium is associated with a decrease in the mean excess return of the hedge portfolio by 0.923. Due to negative beta, the portfolio is weighted to growth stocks rather than value stocks as it's sensitive to stocks with low book-to-market ratios.

RMW: The beta for robust minus weak (RMW) is negative with a magnitude of 0.944. This means that for every increase of 1 in market risk premium is associated with a decrease in the mean excess return of the hedge portfolio by 0.944. The factor determines the profitability of firms so the portfolio is exposed to companies with low operating profitability (robustness).

CMA: The beta for conservative minus aggressive (CMA) is negative with a magnitude of 0.221. However, CMA is not statistically significant, so we have failed to reject the null hypothesis. This concludes that there isn't enough evidence that there is a relationship between the CMA factor and the excess return of the hedge portfolio.

Conclusion

The quick ratio has shown to have a positive relationship with the expected stock return but the estimated beta is too small. Although it is statistically significant, there is no economic significance. This is because the increase in the quick ratio will result in a small change in expected stock return so there's no practicality. The bar chart of decile portfolios showed the 2nd decile portfolio to have the smallest mean stock return and the 10th decile portfolio to have the highest, so we took the difference to calculate the excess return of the hedge portfolio. It was unexpected so there should be further investigation on why the 2nd decile portfolio had a lower mean stock return than the 1st decile. Using the Fama-French 5 factor model, we have found a long-short decile hedge portfolio that generated 140 basis points with a statistically significant result. Moreover, by implementing the 5-factor model, the portfolio was tested on its sensitivity to the risk factor.