FINANCIAL MARKETS ANALYTICS PROJECT

On portfolios tilting based on different metrics

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Data Acquisition

June 2017 - July 2024, S&P500 and yfinance

Regression Analysis

Single factor market model, SML by rolling 180 days regression

Portfolio Building

8 different portfolios, tilting on SML parameters

Final Statistics

Price chart comparison, volatility and return table

Conclusion

Empirical risk-return relationship in portfolios

1 Data Acquisition

FACTSET

S&P500 is NOT a static index: companies enter and exit the index quarterly.

How do you identify which companies belong in the S&P?

2 Regression Analysis

$$r_i - r_f = \alpha_i + \beta_i(r_i - r_f) + \epsilon_i$$

$$r_i = \alpha_i + \beta_i r_i + \epsilon_i$$

$$S_i = \frac{r_i - r_f}{\sigma_i}$$

$$\hat{S}_i = \frac{r_i - r_f}{\sqrt{\frac{\sum_{j=1}^{N}(\min(0,R_j)^2}{N}}}$$

- $\alpha(t)$ — weighted average with alpha significance
- $R^2(t)$ — simple arithmetic average
- $\beta(t)$ — weighted average combined with arithmetic in edge cases
- $\sigma_{ei}^2(t)$ — no averaging needed

3 Portfolio Building

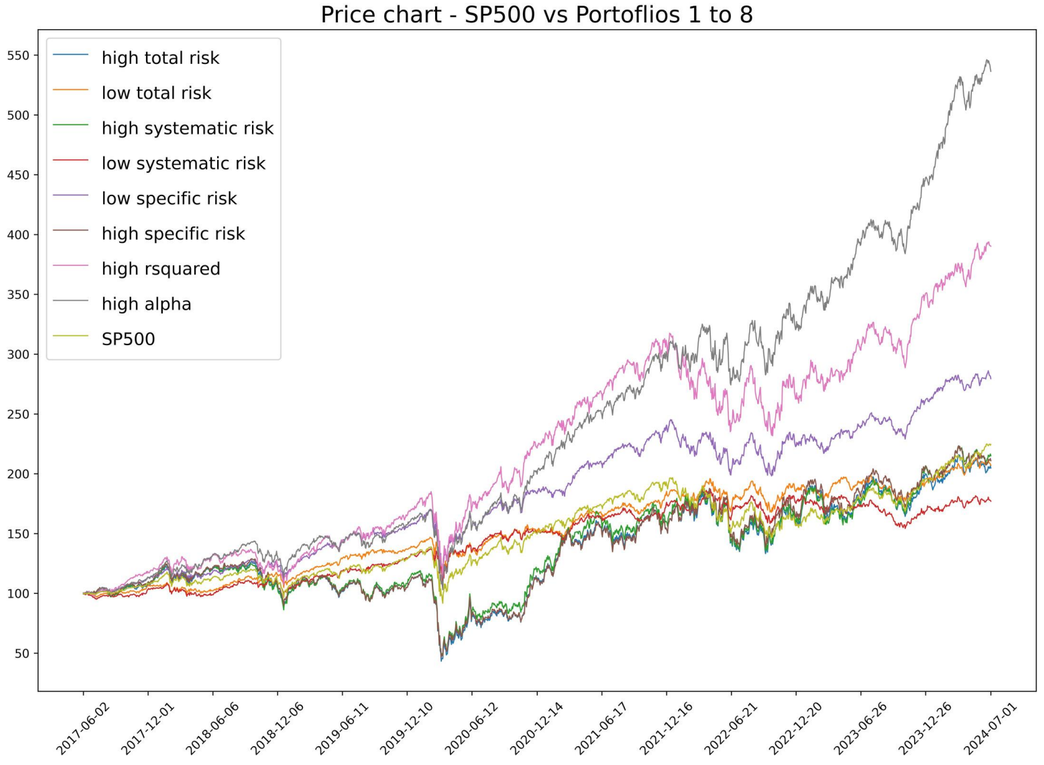
Selecting upper and lower 10% quantile:

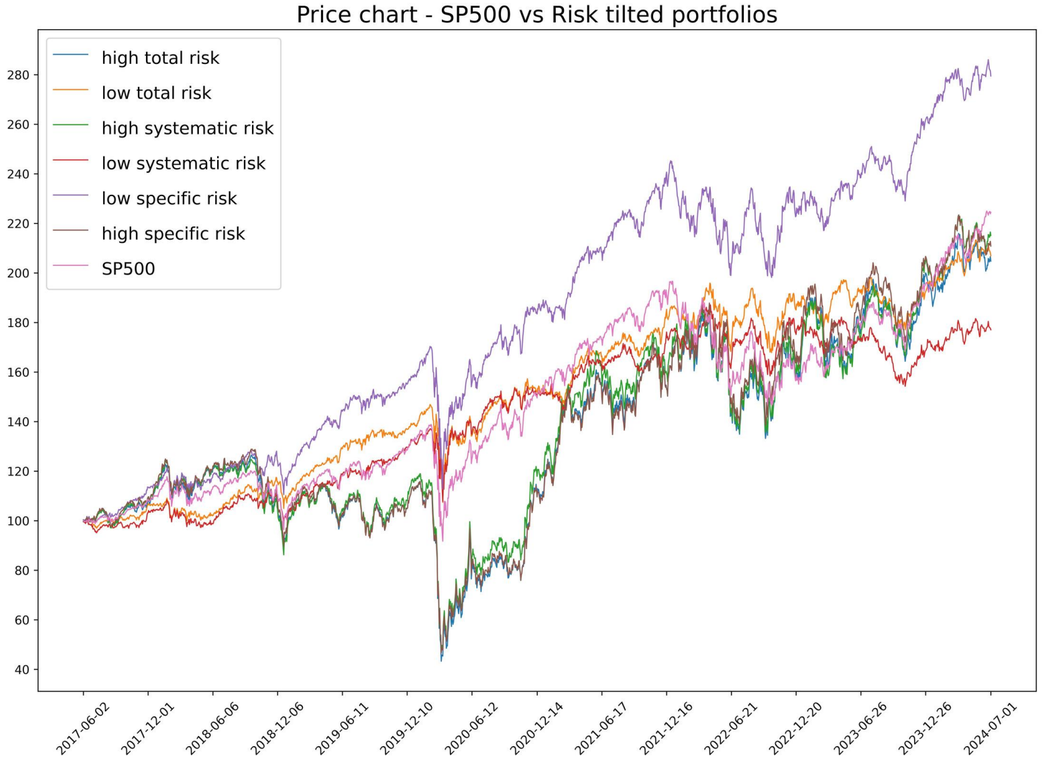
- Portfolio 1: stocks with high values of α
- Portfolio 3: stocks with low systematic risk
- Portfolio 4: stocks with high systematic risk
- Portfolio 5: stocks with low specific risk
- Portfolio 6: stocks with high specific risk
- Portfolio 7: stocks with high total risk
- Portfolio 8: stocks with low total risk

Selecting a value of R^2 over 0.5:

- Portfolio 2: stocks based on goodness of the fit

4 Final Statistics





5 Conclusion

Sorted by Sharpe/Sortino

Portfolio	Total return(%)	Yearly average return(%)	Volatility	Sharpe	Max Downside	Sortino
highest_alpha	434.781705	27.064789	21.047313	1.285902	14.901871	1.816201
highest_rsquared	288.456361	21.392470	23.724671	0.901697	16.542363	1.293193
low_specific_risk	178.485683	15.755935	17.801558	0.885087	12.529358	1.257521
low_total_risk	106.236610	10.894344	15.160281	0.718611	10.593524	1.028397
SP500_index	123.875494	12.202087	19.324872	0.631419	13.883671	0.878880
low_systematic_risk	76.508481	8.455661	14.462752	0.584651	9.988151	0.846569
high_systematic_risk	115.849395	11.618410	31.584752	0.367849	22.569641	0.514780
high_specific_risk	111.779250	11.315277	31.374767	0.360649	22.317296	0.507018
high_total_risk	105.441891	10.833196	32.248686	0.335927	22.965530	0.471715

Thank You

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