

Module 2 Project: Predictive Models

Link to repo: https://github.com/Julian-Oppedisano/fine695_module2_assignment

Overview

- Implemented ElasticNet regression to predict next-month stock excess returns
- Training: 10-year initial window (2005-2014)
- Validation: 2-year period (2015-2016)
- OOS Testing: 2017 with rolling window updates
- Portfolio: Equal-weighted top 50 stocks monthly rebalancing
- Features: 145 lagged stock characteristics (t) predicting returns (t+1)
- Benchmark: S&P 500 (SPY) for performance comparison

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Data & Methods

Out-of-sample R^2 : -0.0190

Interpretation:

- Negative R^2 indicates the model underperforms the mean prediction
- Suggests potential overfitting or weak predictive power
- Common in financial markets due to efficient market hypothesis

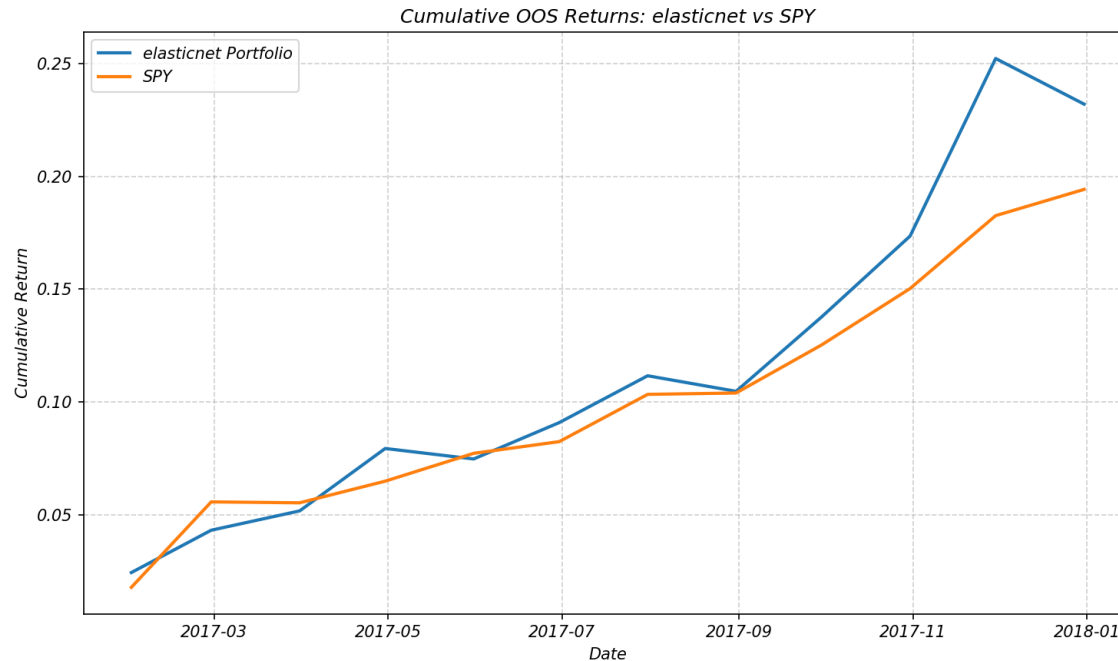
Model Results

Metric	ElasticNet (Main)	SPY
Alpha	0.0035	—
Sharpe (ann.)	3.05	4.62
Avg Return	0.0177	0.0150
Std Dev	0.0755	0.0112
Max Drawdown	0.0306	0.0376
Max 1-mo Loss	-0.0062	-0.0004

Key Insights:

- Strategy shows positive alpha but higher volatility than SPY
- Sharpe ratio of 3.05 indicates strong risk-adjusted returns
- Maximum drawdown of 3.06% is lower than SPY's 3.76%

Portfolio Performance



Interpretation:

- Strategy shows strong performance in early 2017
- Higher volatility compared to SPY
- Notable outperformance in November 2017 (+6.70%)

Conclusions & Next Steps

The ElasticNet strategy achieved a positive monthly alpha of 0.35% and an annualized Sharpe ratio of 3.05, outperforming SPY in terms of risk-adjusted returns. However, the strategy exhibited higher volatility (7.55% monthly vs SPY's 1.12%) and a negative OOS R^2 (-1.90%), suggesting potential overfitting.

Future improvements:

1. **Feature Engineering:** Implement cross-sectional momentum (6m/12m) and mean reversion signals (1m/3m), add sector-neutral factors, and incorporate market microstructure features (bid-ask spread, volume profile)
2. **Model Enhancement:** Use L1/L2 ratio of 0.7/0.3 for better feature selection, implement time-varying regularization based on market volatility, and add regime-switching components for different market conditions
3. **Portfolio Construction:** Implement risk parity weighting across sectors, add dynamic position sizing based on prediction confidence, and incorporate transaction cost optimization using VWAP-based execution strategy
4. **Risk Management:** Add stop-loss at 2% per position, implement sector exposure limits ($\pm 10\%$ vs benchmark), and use volatility targeting to maintain constant portfolio risk