Essence of the Cross Section

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Research Question

How to identify the strongest predictors of expected returns when the relation between returns and firm characteristics is high-dimensional and non-linear?

Insight (1)

The ideal portfolios that achieve the maximum possible Sharpe ratio are sorted on the unobservable **SDF exposures**—or equivalently, expected returns.

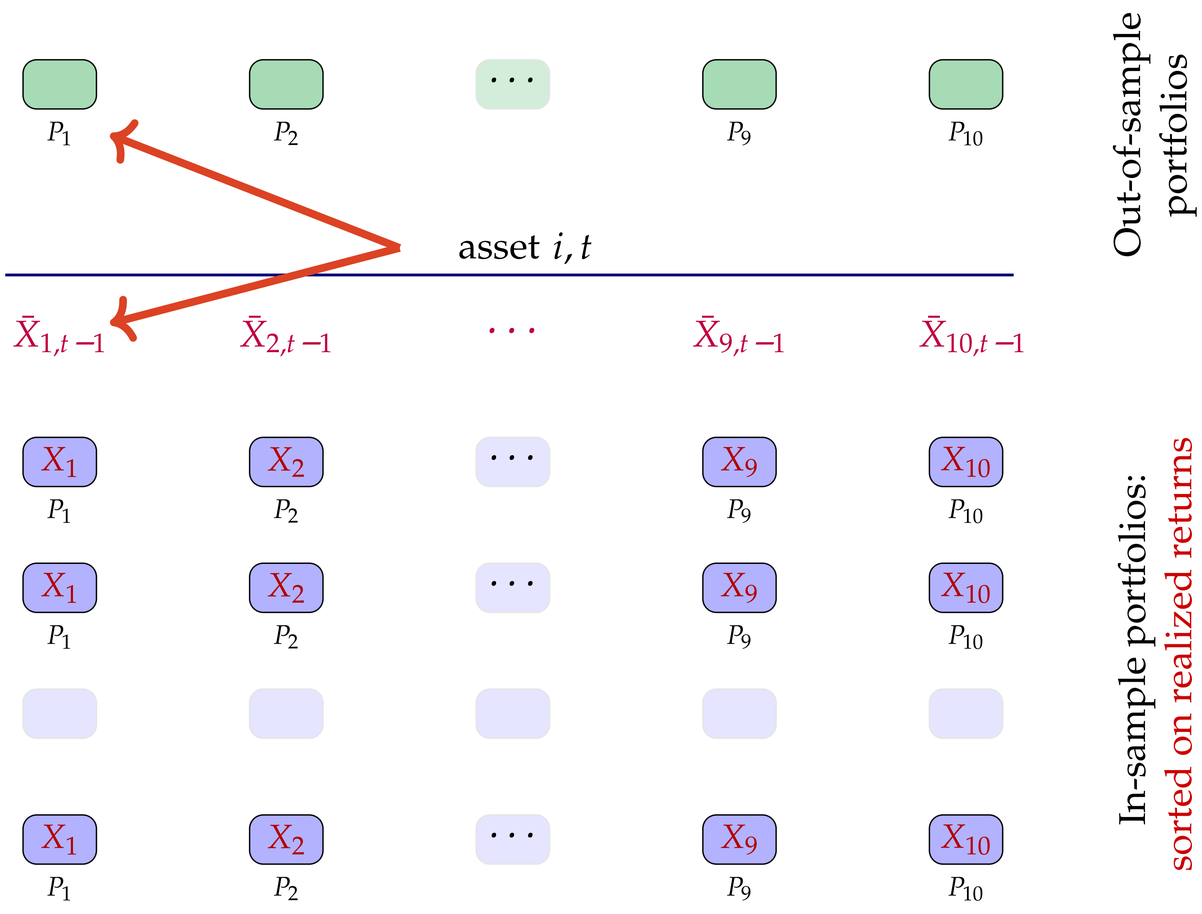
Insight (2)

In-sample, sorting on realized returns produces portfolios with the maximum possible return dispersion and Sharpe ratio, providing an observable proxy for the ideal sorting.

The Key Point

I reverse the standard exercise: instead of sorting stocks on characteristics, I sort stocks on realized returns first, then study which characteristics distinguish losers from winners.

Creating the Portfolios



- **In-sample**: For each month in the past 10 years, I sort stocks into deciles based on that month's realized returns.
- **Characteristics of portfolios**: I calculate the average vector of 178 characteristics for each decile.
- **Out-of-sample**: I create out-of-sample portfolios that are as similar as possible to the in-sample return-sorted portfolios, in terms of characteristics.

Results

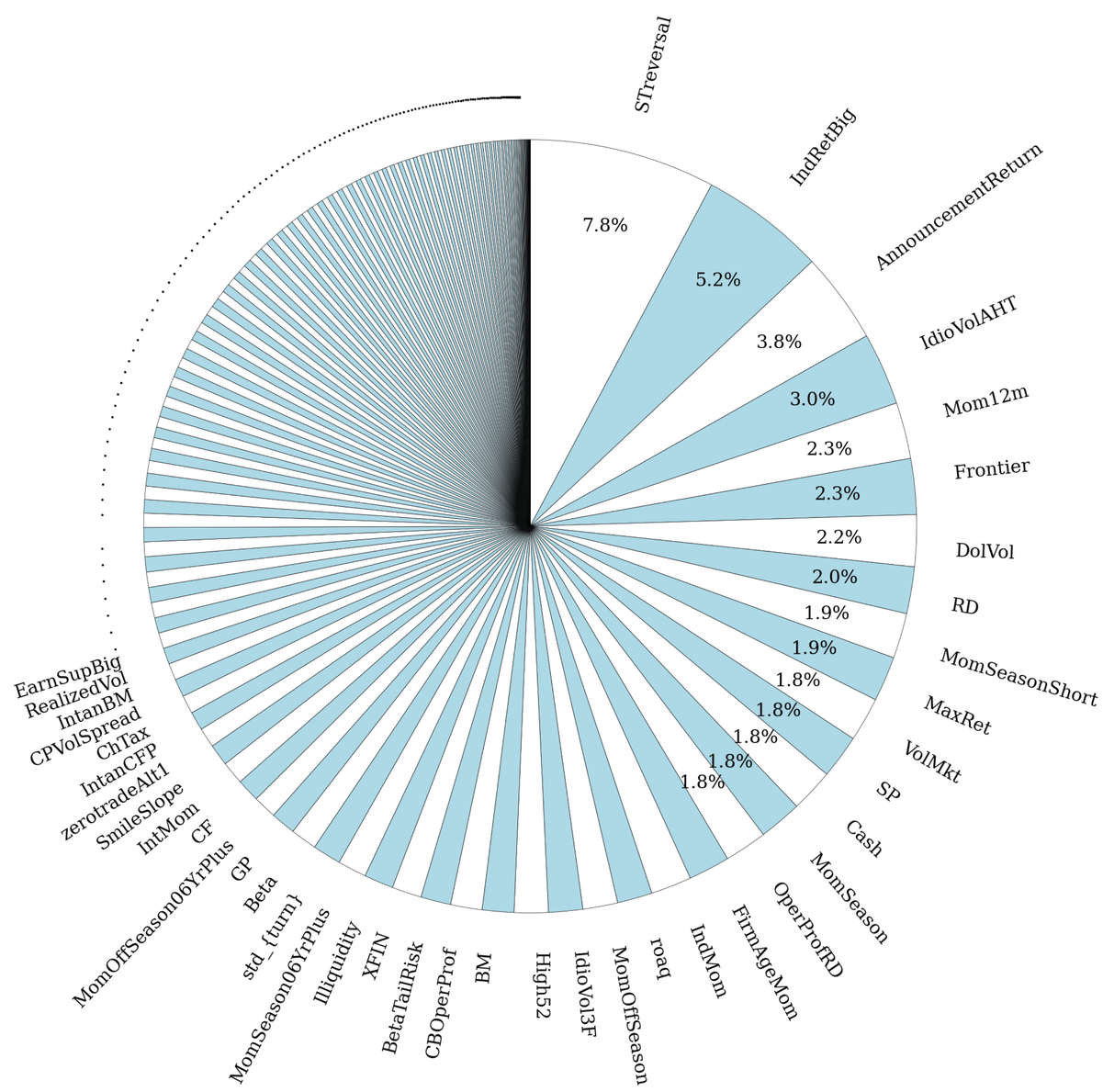
The return-sorted strategy:

- has an annualized out-of-sample Sharpe ratio of **3.51**
- outperforms leading machine-learning strategies

	mean	SR	α_{CAPM}	α t-stat
1	-0.61	-0.06	-1.44	-5.46
2	0.01	0.00	-0.74	-5.19
3	0.54	0.09	-0.08	-0.66
4	0.54	0.11	0.04	0.37
5	0.69	0.18	0.32	3.42
6	0.85	0.23	0.45	5.79
7	0.98	0.21	0.47	6.21
8	1.14	0.21	0.53	6.55
9	1.45	0.21	0.70	5.83
10	2.41	0.27	1.61	6.78
LS	3.02	1.01	3.04	26.34

Monthly performance of out-of-sample portfolios (1967–2022)

Conditional Importance of Characteristics



- **High dimensionality**: 21 characteristics account for 50% of the distance between losers and winners, while roughly 90 are required to account for 90%.
- **Strongest predictors**: The leading predictors are short-term reversal, industry returns of large stocks, announcement returns, idiosyncratic volatility, and momentum.
- **Interactions**: The most important interactions involve reversal, volatility, momentum, and dollar volume.