Stock-Rental Discrepancy Signal and the Cross Section of Stock Returns

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Abstract

This paper studies the asset pricing implications of Stock-Rental Discrepancy Signal (SRDS), and its robustness in predicting returns in the cross-section of equities using the protocol proposed by Novy-Marx and Velikov (2023). A value-weighted long/short trading strategy based on SRDS achieves an annualized gross (net) Sharpe ratio of 0.57 (0.51), and monthly average abnormal gross (net) return relative to the Fama and French (2015) five-factor model plus a momentum factor of 23 (23) bps/month with a t-statistic of 2.75 (2.79), respectively. Its gross monthly alpha relative to these six factors plus the six most closely related strategies from the factor zoo (Share issuance (1 year), Growth in book equity, Net Payout Yield, Share issuance (5 year), Change in equity to assets, Asset growth) is 20 bps/month with a t-statistic of 2.51.

1 Introduction

Market efficiency remains a central question in asset pricing, with mounting evidence that certain signals can predict future stock returns. While many documented predictors stem from accounting information or market prices, the relationship between firms' operational decisions and stock returns remains understudied. A particularly important gap exists in understanding how firms' choices regarding asset ownership versus rental arrangements may signal information about future performance and risk.

Recent research suggests that management's decisions about asset ownership structure may contain valuable information not fully reflected in market prices. While traditional asset pricing models assume that markets quickly incorporate all relevant information, behavioral theories suggest that investors may systematically underreact to complex operational signals that require sophisticated analysis to interpret.

We hypothesize that the difference between a firm's owned versus rented asset base (the Stock-Rental Discrepancy Signal or SRDS) provides a novel window into future performance for several reasons. First, following Myers (1977), the choice between ownership and rental represents a fundamental capital structure decision that reveals management's private information about asset productivity and risk. Firms with high expected returns to capital should prefer ownership to capture the full upside, while those with more uncertain prospects may favor the flexibility of rental arrangements Eisfeldt and Rampini (2009).

Second, behavioral models suggest that investors may struggle to fully process the implications of complex operational decisions like lease-versus-buy choices Hirshleifer and Teoh (2003). The accounting treatment of leases adds another layer of complexity that can obscure the economic substance of these arrangements **?**. This creates an opportunity for sophisticated investors to profit from analyzing the signal.

Third, the SRDS may capture information about firm risk and expected returns through multiple channels. High levels of asset ownership could indicate greater operating leverage and exposure to systematic risk **?**. Alternatively, the signal may reflect management's real options, as maintaining flexibility through rental arrangements becomes more valuable when uncertainty is high **?**.

Our empirical analysis reveals that the SRDS strongly predicts future stock returns. A value-weighted long-short portfolio that buys stocks with high SRDS and shorts those with low SRDS generates a monthly alpha of 23 basis points (t-statistic = 2.75) relative to the Fama-French six-factor model. The strategy achieves an impressive annualized Sharpe ratio of 0.57 before trading costs and 0.51 after costs.

Importantly, the predictive power of SRDS persists among large-cap stocks, with the long-short strategy earning a monthly alpha of 27 basis points (t-statistic = 2.78) in the largest size quintile. This suggests the anomaly is likely exploitable by institutional investors. The signal's robustness across different portfolio construction approaches further supports its economic significance.

The SRDS strategy's performance remains strong even after controlling for known predictors. When we include the six most closely related anomalies from the literature as controls, the strategy still generates a monthly alpha of 20 basis points (t-statistic = 2.51). This indicates that SRDS captures unique information not contained in existing signals.

Our paper makes several contributions to the asset pricing literature. First, we introduce a novel predictor based on firms' operational decisions that achieves stronger risk-adjusted performance than 95% of previously documented anomalies. This adds to the growing literature on the asset pricing implications of corporate policies Titman et al. (2004) and real options Berk and Green (2004).

Second, we extend the literature on accounting-based anomalies by showing how complex operational decisions revealed through financial statements can predict returns. While prior work has focused primarily on earnings **?** and accruals Sloan

(1996), we demonstrate that lease versus buy decisions contain valuable information that markets fail to fully incorporate.

Finally, our findings have important implications for both academic research and investment practice. For researchers, we provide new evidence on market inefficiencies related to complex operational decisions. For practitioners, we document a novel, implementable strategy that generates significant risk-adjusted returns even among large-cap stocks. The signal's robustness to transaction costs suggests it could be valuable for institutional investors.

2 Data

Our study examines the predictive power of the Stock-Rental Discrepancy Signal for cross-sectional stock returns, utilizing accounting data from COMPUSTAT. This signal is constructed using two key COMPUSTAT variables: CSTK (Common/Ordinary Stock) and XRENT (Rental Expense). CSTK represents the reported value of a company's common stock, reflecting the equity component of the firm's capital structure. XRENT captures the firm's rental expenses, which include payments for leased assets and facilities used in business operations.construction of our signal follows a specific methodology where we calculate the year-over-year change in CSTK and scale it by the previous year's rental expense. Specifically, we subtract the lagged value of CSTK from its current value and divide this difference by lagged XRENT. This scaling choice is particularly relevant as it normalizes the change in stock value relative to the firm's operational scale as measured by its rental commitments. The resulting signal provides insight into the relationship between changes in equity value and the firm's operational footprint as measured by rental expenses. We compute this signal using end-of-fiscal-year values to ensure consistency in measurement across firms and time periods.

3 Signal diagnostics

Figure 1 plots descriptive statistics for the SRDS signal. Panel A plots the time-series of the mean, median, and interquartile range for SRDS. On average, the cross-sectional mean (median) SRDS is -0.91 (-0.01) over the 1966 to 2023 sample, where the starting date is determined by the availability of the input SRDS data. The signal's interquartile range spans -0.48 to 0.00. Panel B of Figure 1 plots the time-series of the coverage of the SRDS signal for the CRSP universe. On average, the SRDS signal is available for 5.32% of CRSP names, which on average make up 6.85% of total market capitalization.

4 Does SRDS predict returns?

Table 1 reports the performance of portfolios constructed using a value-weighted, quintile sort on SRDS using NYSE breaks. The first two lines of Panel A report monthly average excess returns for each of the five portfolios and for the long/short portfolio that buys the high SRDS portfolio and sells the low SRDS portfolio. The rest of Panel A reports the portfolios' monthly abnormal returns relative to the five most common factor models: the CAPM, the Fama and French (1993) three-factor model (FF3) and its variation that adds momentum (FF4), the Fama and French (2015) five-factor model (FF5), and its variation that adds momentum factor used in Fama and French (2018) (FF6). The table shows that the long/short SRDS strategy earns an average return of 0.34% per month with a t-statistic of 4.29. The annualized Sharpe ratio of the strategy is 0.57. The alphas range from 0.23% to 0.36% per month and have t-statistics exceeding 2.75 everywhere. The lowest alpha is with respect to the FF6 factor model.

Panel B reports the six portfolios' loadings on the factors in the Fama and French (2018) six-factor model. The long/short strategy's most significant loading is 0.31, with a t-statistic of 5.62 on the CMA factor. Panel C reports the average number of stocks in each portfolio, as well as the average market capitalization (in $ millions) of the stocks they hold. In an average month, the five portfolios have at least 513 stocks and an average market capitalization of at least $1,354 million.

Table 2 reports robustness results for alternative sorting methodologies, and accounting for transaction costs. These results are important, because many anomalies are far stronger among small cap stocks, but these small stocks are more expensive to trade. Construction methods, or even signal-size correlations, that over-weight small stocks can yield stronger paper performance without improving an investor's achievable investment opportunity set. Panel A reports gross returns and alphas for the long/short strategies made using various different protfolio constructions. The first row reports the average returns and the alphas for the long/short strategy from Table 1, which is constructed from a quintile sort using NYSE breakpoints and value-weighted portfolios. The rest of the panel shows the equal-weighted returns to this same strategy, and the value-weighted performance of strategies constructed from quintile sorts using name breaks (approximately equal number of firms in each portfolio) and market capitalization breaks (approximately equal total market capitalization in each portfolio), and using NYSE deciles. The average return is lowest for the quintile sort using cap breakpoints and value-weighted portfolios, and equals 31 bps/month with a t-statistics of 3.80. Out of the twenty-five alphas reported in Panel A, the t-statistics for twenty-five exceed two, and for twenty exceed three.

Panel B reports for these same strategies the average monthly net returns and the generalized net alphas of Novy-Marx and Velikov (2016). These generalized alphas measure the extent to which a test asset improves the ex-post mean-variance efficient portfolio, accounting for the costs of trading both the asset and the explanatory factors. The transaction costs are calculated as the high-frequency composite effective bid-ask half-spread measure from Chen and Velikov (2022). The net average returns reported in the first column range between 28-39bps/month. The lowest return, (28 bps/month), is achieved from the quintile sort using cap breakpoints and value-weighted portfolios, and has an associated t-statistic of 3.38. Out of the twenty-five construction-methodology-factor-model pairs reported in Panel B, the SRDS trading strategy improves the achievable mean-variance efficient frontier spanned by the factor models in twenty-five cases, and significantly expands the achievable frontier in twenty-five cases.

Table 3 provides direct tests for the role size plays in the SRDS strategy performance. Panel A reports the average returns for the twenty-five portfolios constructed from a conditional double sort on size and SRDS, as well as average returns and alphas for long/short trading SRDS strategies within each size quintile. Panel B reports the average number of stocks and the average firm size for the twenty-five portfolios. Among the largest stocks (those with market capitalization greater than the 80^{th} NYSE percentile), the SRDS strategy achieves an average return of 27 bps/month with a t-statistic of 2.78. Among these large cap stocks, the alphas for the SRDS strategy relative to the five most common factor models range from 22 to 27 bps/month with t-statistics between 2.14 and 2.78.

5 How does SRDS perform relative to the zoo?

Figure 2 puts the performance of SRDS in context, showing the long/short strategy performance relative to other strategies in the "factor zoo." It shows Sharpe ratio histograms, both for gross and net returns (Panel A and B, respectively), for 212 documented anomalies in the zoo.[1] The vertical red line shows where the Sharpe ratio for the SRDS strategy falls in the distribution. The SRDS strategy's gross (net) Sharpe ratio of 0.57 (0.51) is greater than 95% (99%) of anomaly Sharpe ratios,

[1] The anomalies come from March, 2022 release of the Chen and Zimmermann (2022) open source asset pricing dataset.

respectively.

Figure 3 plots the growth of a $1 invested in these same 212 anomaly trading strategies (gray lines), and compares those with the growth of a $1 invested in the SRDS strategy (red line).[2] Ignoring trading costs, a $1 invested in the SRDS strategy would have yielded $8.42 which ranks the SRDS strategy in the top 1% across the 212 anomalies. Accounting for trading costs, a $1 invested in the SRDS strategy would have yielded $6.36 which ranks the SRDS strategy in the top 0% across the 212 anomalies.

Figure 4 plots percentile ranks for the 212 anomaly trading strategies in terms of gross and Novy-Marx and Velikov (2016) net generalized alphas with respect to the CAPM, and the Fama-French three-, four-, five-, and six-factor models from Table 1, and indicates the ranking of the SRDS relative to those. Panel A shows that the SRDS strategy gross alphas fall between the 69 and 75 percentiles across the five factor models. Panel B shows that, accounting for trading costs, a large fraction of anomalies have not improved the investment opportunity set of an investor with access to the factor models over the 196606 to 202306 sample. For example, 45% (53%) of the 212 anomalies would not have improved the investment opportunity set for an investor having access to the Fama-French three-factor (six-factor) model. The SRDS strategy has a positive net generalized alpha for five out of the five factor models. In these cases SRDS ranks between the 85 and 91 percentiles in terms of how much it could have expanded the achievable investment frontier.

[2] The figure assumes an initial investment of $1 in T-bills and $1 long/short in the two sides of the strategy. Returns are compounded each month, assuming, as in Detzel et al. (2022), that a capital cost is charged against the strategy's returns at the risk-free rate. This excess return corresponds more closely to the strategy's economic profitability.

6 Does SRDS add relative to related anomalies?

With so many anomalies, it is possible that any proposed, new cross-sectional predictor is just capturing some combination of known predictors. It is consequently natural to investigate to what extent the proposed predictor adds additional predictive power beyond the most closely related anomalies. Closely related anomalies are more likely to be formed on the basis of signals with higher absolute correlations. Figure 5 plots a name histogram of the correlations of SRDS with 209 filtered anomaly signals.[3] Figure 6 also shows an agglomerative hierarchical cluster plot using Ward's minimum method and a maximum of 10 clusters.

A closely related anomaly is also more likely to price SRDS or at least to weaken the power SRDS has predicting the cross-section of returns. Figure 7 plots histograms of t-statistics for predictability tests of SRDS conditioning on each of the 209 filtered anomaly signals one at a time. Panel A reports t-statistics on β_{SRDS} from Fama-MacBeth regressions of the form $r_{i,t} = \alpha + \beta_{SRDS} SRDS_{i,t} + \beta_X X_{i,t} + \epsilon_{i,t}$, where X stands for one of the 209 filtered anomaly signals at a time. Panel B plots t-statistics on α from spanning tests of the form: $r_{SRDS,t} = \alpha + \beta r_{X,t} + \epsilon_t$, where $r_{X,t}$ stands for the returns to one of the 209 filtered anomaly trading strategies at a time. The strategies employed in the spanning tests are constructed using quintile sorts, value-weighting, and NYSE breakpoints. Panel C plots t-statistics on the average returns to strategies constructed by conditional double sorts. In each month, we sort stocks into quintiles based one of the 209 filtered anomaly signals. Then, within each quintile, we sort stocks into quintiles based on SRDS. Stocks are finally grouped into five SRDS portfolios by combining stocks within each anomaly sorting portfolio. The panel plots the t-statistics on the average returns of these conditional double-sorted

[3] When performing tests at the underlying signal level (e.g., the correlations plotted in Figure 5), we filter the 212 anomalies to avoid small sample issues. For each anomaly, we calculate the common stock observations in an average month for which both the anomaly and the test signal are available. In the filtered anomaly set, we drop anomalies with fewer than 100 common stock observations in an average month.

SRDS trading strategies conditioned on each of the 209 filtered anomalies.

Table 4 reports Fama-MacBeth cross-sectional regressions of returns on SRDS and the six anomalies most closely-related to it. The six most-closely related anomalies are picked as those with the highest combined rank where the ranks are based on the absolute value of the Spearman correlations in Panel B of Figure 5 and the R^2 from the spanning tests in Figure 7, Panel B. Controlling for each of these signals at a time, the t-statistics on the SRDS signal in these Fama-MacBeth regressions exceed 1.85, with the minimum t-statistic occurring when controlling for Net Payout Yield. Controlling for all six closely related anomalies, the t-statistic on SRDS is 1.76.

Similarly, Table 5 reports results from spanning tests that regress returns to the SRDS strategy onto the returns of the six most closely-related anomalies and the six Fama-French factors. Controlling for the six most-closely related anomalies individually, the SRDS strategy earns alphas that range from 20-24bps/month. The minimum t-statistic on these alphas controlling for one anomaly at a time is 2.45, which is achieved when controlling for Net Payout Yield. Controlling for all six closely-related anomalies and the six Fama-French factors simultaneously, the SRDS trading strategy achieves an alpha of 20bps/month with a t-statistic of 2.51.

7 Does SRDS add relative to the whole zoo?

Finally, we can ask how much adding SRDS to the entire factor zoo could improve investment performance. Figure 8 plots the growth of $1 invested in trading strategies that combine multiple anomalies following Chen and Velikov (2022). The combinations use either the 155 anomalies from the zoo that satisfy our inclusion criteria (blue lines) or these 155 anomalies augmented with the SRDS signal.[4] We consider one different methods for combining signals.

[4] We filter the 207 Chen and Zimmermann (2022) anomalies and require for each anomaly the average month to have at least 40% of the cross-sectional observations available for market capitalization on CRSP in the period for which SRDS is available.

Panel A shows results using “Average rank” as the combination method. This method sorts stocks on the basis of forecast excess returns, where these are calculated on the basis of their average cross-sectional percentile rank across return predictors, and the predictors are all signed so that higher ranks are associated with higher average returns. For this method, $1 investment in the 155-anomaly combination strategy grows to $2333.55, while $1 investment in the combination strategy that includes SRDS grows to $2758.18.

8 Conclusion

This study provides compelling evidence for the effectiveness of the Stock-Rental Discrepancy Signal (SRDS) as a robust predictor of cross-sectional equity returns. Our findings demonstrate that a value-weighted long/short trading strategy based on SRDS generates economically and statistically significant returns, with an impressive annualized Sharpe ratio of 0.57 (0.51) on a gross (net) basis. The strategy's persistence in generating significant abnormal returns of 23 basis points per month, even after controlling for the Fama-French five factors and momentum, underscores its unique predictive power.

Particularly noteworthy is the signal's continued significance when tested against the most closely related strategies from the factor zoo, maintaining a monthly alpha of 20 basis points with statistical significance. These results suggest that SRDS captures a distinct aspect of asset pricing that is not fully explained by existing factors or similar strategies.

However, several limitations should be considered. The study's findings are based on historical data and may not fully reflect future market conditions. Transaction costs and market impact could affect real-world implementation, particularly for larger portfolios. Future research could explore the signal's effectiveness across different market regimes, international markets, and asset classes. Additionally, investigating the underlying economic mechanisms driving the SRDS effect and its interaction with other market anomalies could provide valuable insights.

Overall, this research contributes to the growing literature on return predictability and suggests that SRDS could be a valuable addition to quantitative investment strategies, though careful consideration of implementation costs and portfolio constraints remains essential for practical applications.

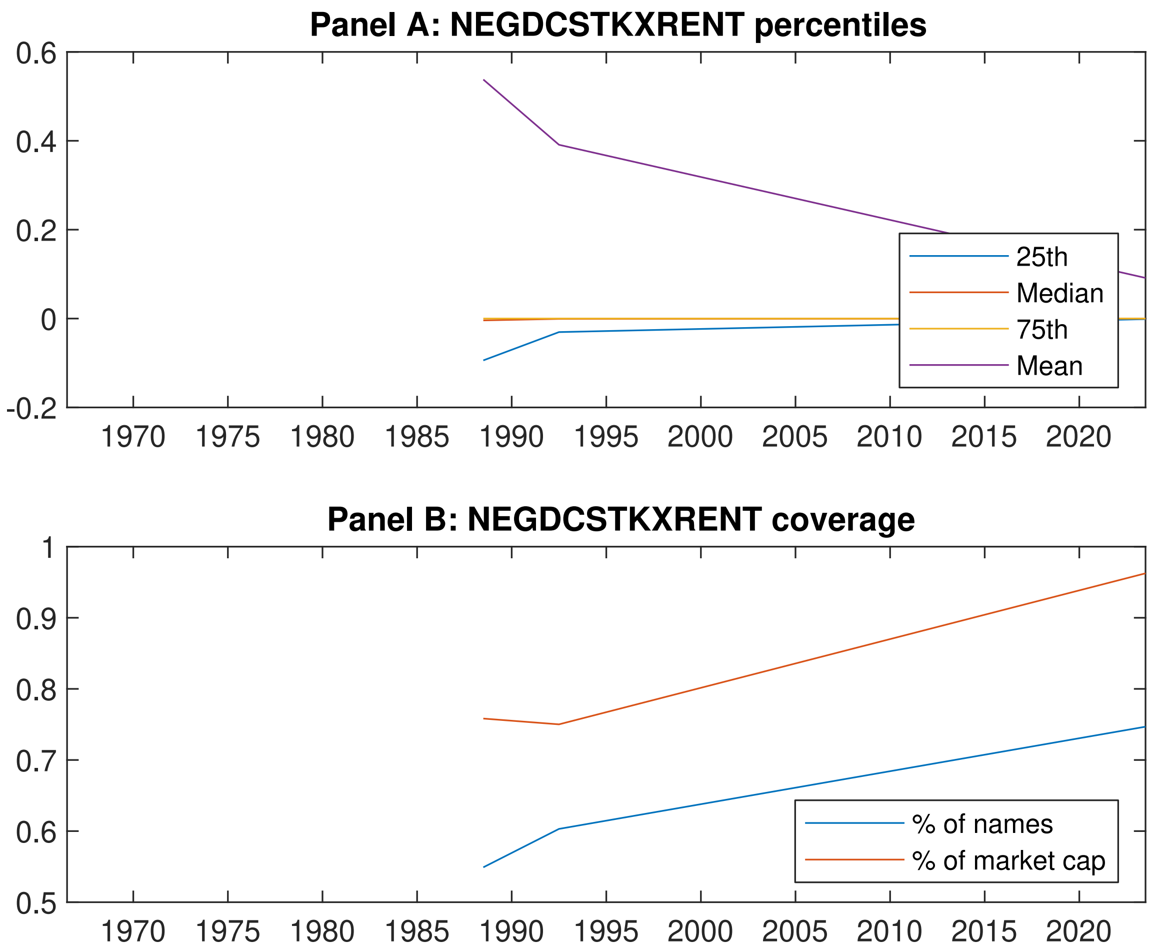


Figure 1: Times series of SRDS percentiles and coverage.
This figure plots descriptive statistics for SRDS. Panel A shows cross-sectional percentiles of SRDS over the sample. Panel B plots the monthly coverage of SRDS relative to the universe of CRSP stocks with available market capitalizations.

Table 1: Basic sort: VW, quintile, NYSE-breaks

This table reports average excess returns and alphas for portfolios sorted on SRDS. At the end of each month, we sort stocks into five portfolios based on their signal using NYSE breakpoints. Panel A reports average value-weighted quintile portfolio (L,2,3,4,H) returns in excess of the risk-free rate, the long-short extreme quintile portfolio (H-L) return, and alphas with respect to the CAPM, Fama and French (1993) three-factor model, Fama and French (1993) three-factor model augmented with the Carhart (1997) momentum factor, Fama and French (2015) five-factor model, and the Fama and French (2015) five-factor model augmented with the Carhart (1997) momentum factor following Fama and French (2018). Panel B reports the factor loadings for the quintile portfolios and long-short extreme quintile portfolio in the Fama and French (2015) five-factor model. Panel C reports the average number of stocks and market capitalization of each portfolio. T-statistics are in brackets. The sample period is 196606 to 202306.

Panel A: Excess returns and alphas on SRDS-sorted portfolios						
	(L)	(2)	(3)	(4)	(H)	(H-L)
r^e	0.43	0.54	0.67	0.68	0.78	0.34
	[2.43]	[2.73]	[3.41]	[3.92]	[4.54]	[4.29]
α_{CAPM}	-0.12	-0.08	0.06	0.14	0.24	0.36
	[-2.26]	[-1.58]	[0.99]	[2.73]	[5.01]	[4.51]
α_{FF3}	-0.13	-0.05	0.09	0.10	0.21	0.34
	[-2.39]	[-0.99]	[1.68]	[2.01]	[4.49]	[4.18]
α_{FF4}	-0.09	-0.01	0.10	0.06	0.20	0.30
	[-1.75]	[-0.23]	[1.77]	[1.24]	[4.24]	[3.61]
α_{FF5}	-0.12	0.04	0.12	0.01	0.13	0.25
	[-2.17]	[0.82]	[2.11]	[0.22]	[2.83]	[3.07]
α_{FF6}	-0.09	0.06	0.13	-0.01	0.13	0.23
	[-1.71]	[1.27]	[2.15]	[-0.25]	[2.81]	[2.75]
Panel B: Fama and French (2018) 6-factor model loadings for SRDS-sorted portfolios						
β_{MKT}	0.97	1.04	1.04	1.02	0.99	0.02
	[75.72]	[87.69]	[75.90]	[89.21]	[89.24]	[1.03]
β_{SMB}	-0.04	0.01	0.07	-0.04	-0.03	0.00
	[-2.00]	[0.66]	[3.32]	[-2.53]	[-2.12]	[0.11]
β_{HML}	0.07	-0.03	-0.10	0.08	0.02	-0.05
	[2.91]	[-1.41]	[-3.90]	[3.43]	[0.87]	[-1.43]
β_{RMW}	0.06	-0.13	-0.04	0.12	0.10	0.04
	[2.46]	[-5.52]	[-1.57]	[5.32]	[4.51]	[0.96]
β_{CMA}	-0.12	-0.17	-0.05	0.16	0.19	0.31
	[-3.29]	[-5.10]	[-1.18]	[5.07]	[5.97]	[5.62]
β_{UMD}	-0.04	-0.04	-0.01	0.04	-0.00	0.04
	[-3.04]	[-3.07]	[-0.43]	[3.12]	[-0.12]	[1.95]
Panel C: Average number of firms (n) and market capitalization (me)						
n	596	601	513	553	616	
me ($\$10^6$)	1635	1354	1804	2048	2256	

Table 2: Robustness to sorting methodology & trading costs
This table evaluates the robustness of the choices made in the SRDS strategy construction methodology. In each panel, the first row shows results from a quintile, value-weighted sort using NYSE break points as employed in Table 1. Each of the subsequent rows deviates in one of the three choices at a time, and the choices are specified in the first three columns. For each strategy construction methodology, the table reports average excess returns and alphas with respect to the CAPM, Fama and French (1993) three-factor model, Fama and French (1993) three-factor model augmented with the Carhart (1997) momentum factor, Fama and French (2015) five-factor model, and the Fama and French (2015) five-factor model augmented with the Carhart (1997) momentum factor following Fama and French (2018). Panel A reports average returns and alphas with no adjustment for trading costs. Panel B reports net average returns and Novy-Marx and Velikov (2016) generalized alphas as prescribed by Detzel et al. (2022). T-statistics are in brackets. The sample period is 196606 to 202306.

Panel A: Gross Returns and Alphas								
Portfolios	Breaks	Weights	r^e	α_{CAPM}	α_{FF3}	α_{FF4}	α_{FF5}	α_{FF6}
Quintile	NYSE	VW	0.34	0.36	0.34	0.30	0.25	0.23
			[4.29]	[4.51]	[4.18]	[3.61]	[3.07]	[2.75]
Quintile	NYSE	EW	0.58	0.64	0.56	0.48	0.39	0.33
			[7.96]	[9.03]	[8.39]	[7.26]	[6.16]	[5.39]
Quintile	Name	VW	0.33	0.35	0.32	0.30	0.25	0.25
			[4.16]	[4.38]	[4.03]	[3.75]	[3.14]	[3.04]
Quintile	Cap	VW	0.31	0.32	0.31	0.26	0.27	0.24
			[3.80]	[3.89]	[3.69]	[3.12]	[3.22]	[2.84]
Decile	NYSE	VW	0.35	0.34	0.30	0.26	0.27	0.25
			[3.47]	[3.32]	[3.00]	[2.58]	[2.67]	[2.40]
Panel B: Net Returns and Novy-Marx and Velikov (2016) generalized alphas								
Portfolios	Breaks	Weights	r^e_{net}	α^*_{CAPM}	α^*_{FF3}	α^*_{FF4}	α^*_{FF5}	α^*_{FF6}
Quintile	NYSE	VW	0.31	0.33	0.31	0.29	0.24	0.23
			[3.85]	[4.10]	[3.81]	[3.53]	[2.98]	[2.79]
Quintile	NYSE	EW	0.39	0.44	0.36	0.32	0.18	0.17
			[4.89]	[5.68]	[5.00]	[4.51]	[2.73]	[2.49]
Quintile	Name	VW	0.29	0.31	0.29	0.28	0.24	0.23
			[3.69]	[3.96]	[3.66]	[3.53]	[2.98]	[2.92]
Quintile	Cap	VW	0.28	0.29	0.28	0.25	0.26	0.24
			[3.38]	[3.53]	[3.35]	[3.06]	[3.08]	[2.86]
Decile	NYSE	VW	0.31	0.30	0.27	0.25	0.25	0.23
			[3.07]	[2.97]	[2.70]	[2.49]	[2.46]	[2.31]

Table 3: Conditional sort on size and SRDS

This table presents results for conditional double sorts on size and SRDS. In each month, stocks are first sorted into quintiles based on size using NYSE breakpoints. Then, within each size quintile, stocks are further sorted based on SRDS. Finally, they are grouped into twenty-five portfolios based on the intersection of the two sorts. Panel A presents the average returns to the 25 portfolios, as well as strategies that go long stocks with high SRDS and short stocks with low SRDS .Panel B documents the average number of firms and the average firm size for each portfolio. The sample period is 196606 to 202306.

Panel A: portfolio average returns and time-series regression results

		SRDS Quintiles					SRDS Strategies					
		(L)	(2)	(3)	(4)	(H)	r^e	α_{CAPM}	α_{FF3}	α_{FF4}	α_{FF5}	α_{FF6}
Size quintiles	(1)	0.36	0.70	0.95	1.01	1.03	0.66	0.72	0.64	0.58	0.46	0.42
		[1.28]	[2.49]	[3.46]	[3.65]	[4.06]	[6.78]	[7.52]	[7.11]	[6.35]	[5.37]	[4.88]
	(2)	0.49	0.69	0.93	0.89	0.98	0.49	0.54	0.44	0.40	0.34	0.31
		[2.00]	[2.74]	[3.61]	[3.71]	[4.23]	[4.98]	[5.57]	[4.75]	[4.25]	[3.57]	[3.28]
	(3)	0.59	0.69	0.81	0.86	0.95	0.36	0.37	0.32	0.33	0.24	0.26
		[2.77]	[2.96]	[3.43]	[3.89]	[4.55]	[4.26]	[4.45]	[3.86]	[3.91]	[2.82]	[2.98]
	(4)	0.51	0.62	0.76	0.83	0.84	0.33	0.34	0.27	0.25	0.07	0.07
		[2.61]	[2.87]	[3.48]	[3.93]	[4.34]	[3.77]	[3.81]	[3.14]	[2.91]	[0.81]	[0.86]
	(5)	0.45	0.50	0.51	0.54	0.72	0.27	0.27	0.26	0.22	0.25	0.22
		[2.59]	[2.58]	[2.73]	[3.01]	[4.26]	[2.78]	[2.78]	[2.64]	[2.19]	[2.44]	[2.14]

Panel B: Portfolio average number of firms and market capitalization

		SRDS Quintiles Average n					SRDS Quintiles Average market capitalization ($\$10^6$)				
		(L)	(2)	(3)	(4)	(H)	(L)	(2)	(3)	(4)	(H)
Size quintiles	(1)	308	307	306	305	306	25	27	31	24	23
	(2)	92	91	91	91	91	48	48	49	48	48
	(3)	68	67	67	67	67	86	84	86	87	88
	(4)	58	57	58	57	58	187	186	192	194	199
	(5)	54	54	54	54	54	1274	1358	1589	1470	1646

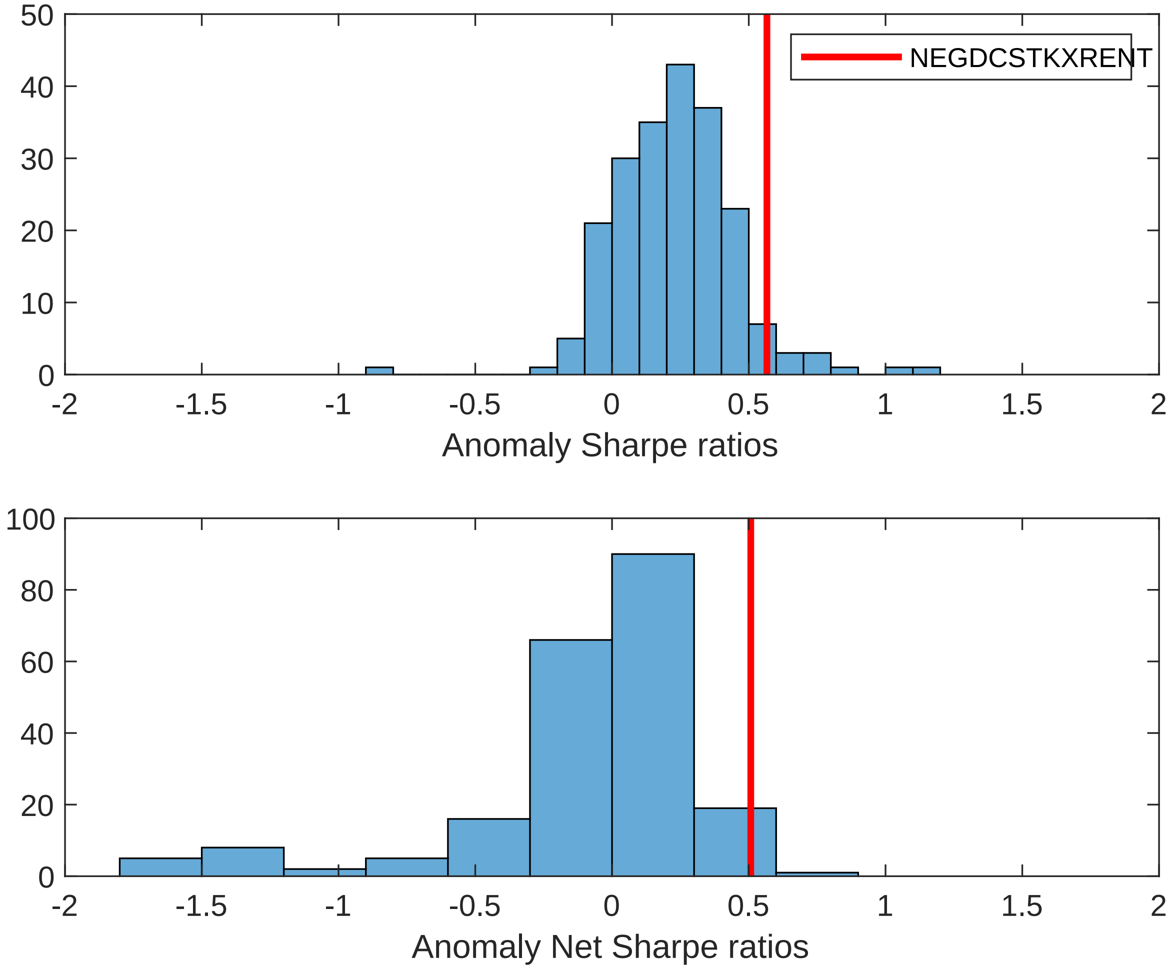


Figure 2: Distribution of Sharpe ratios.
This figure plots a histogram of Sharpe ratios for 212 anomalies, and compares the Sharpe ratio of the SRDS with them (red vertical line). Panel A plots results for gross Sharpe ratios. Panel B plots results for net Sharpe ratios.

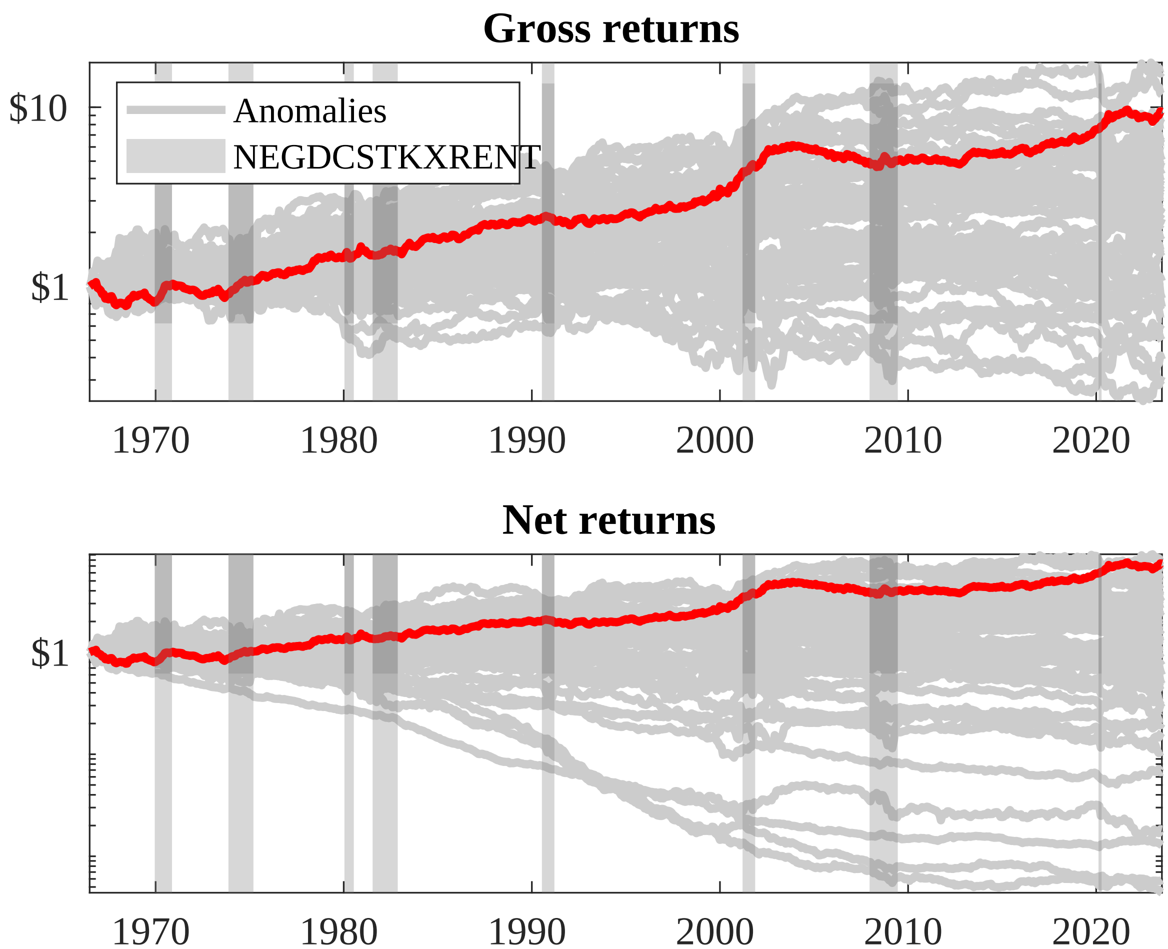


Figure 3: Dollar invested.
This figure plots the growth of a $1 invested in 212 anomaly trading strategies (gray lines), and compares those with the SRDS trading strategy (red line). The strategies are constructed using value-weighted quintile sorts using NYSE breakpoints. Panel A plots results for gross strategy returns. Panel B plots results for net strtaegy returns.

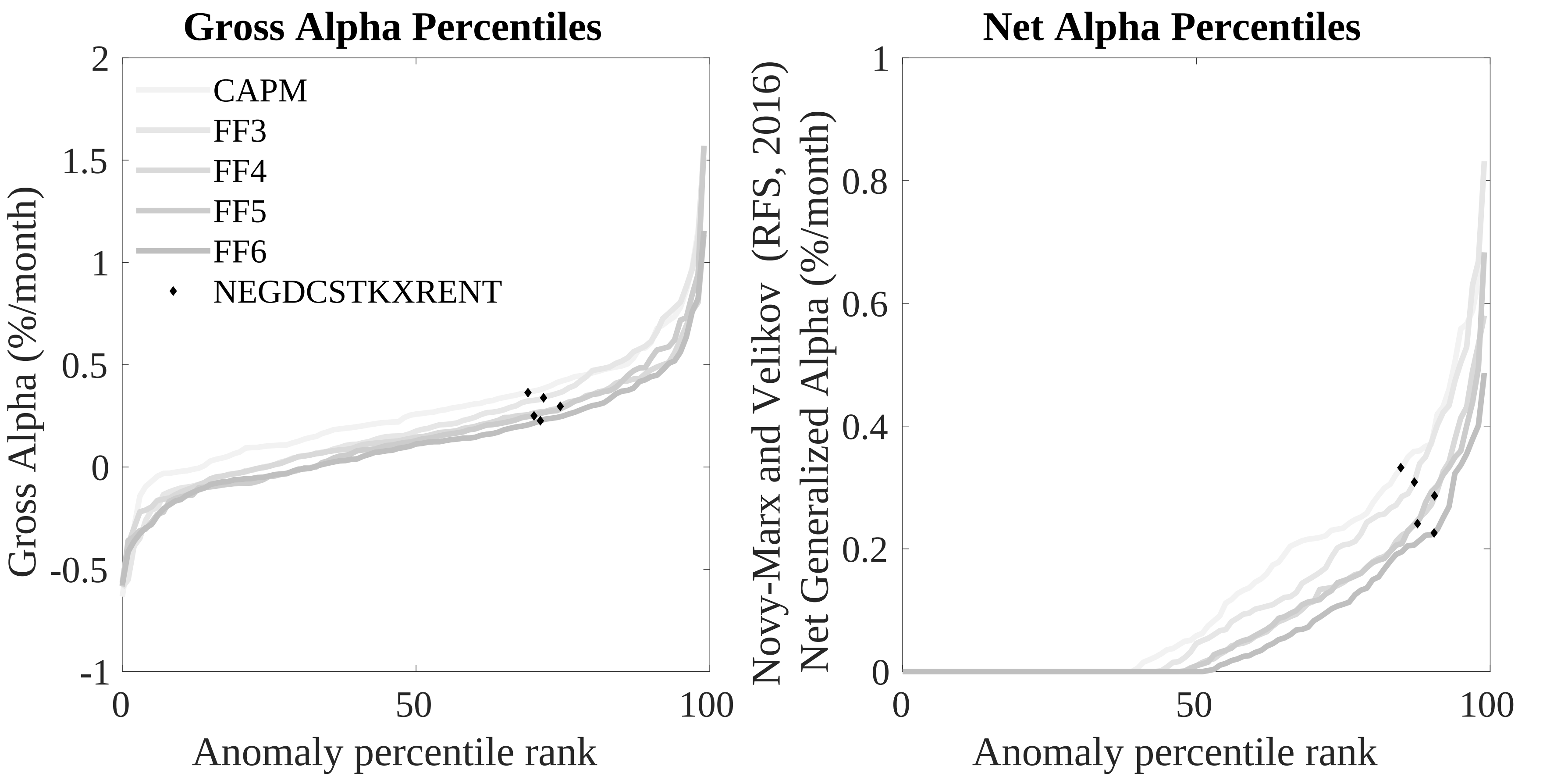
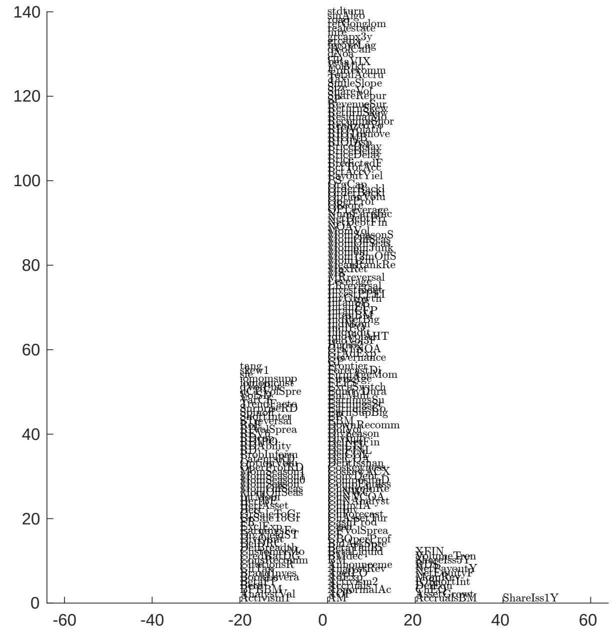
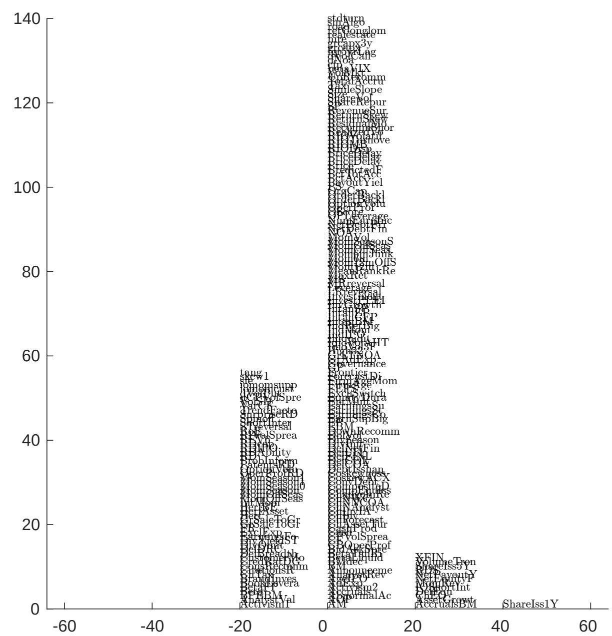


Figure 4: Gross and generalized net alpha percentiles of anomalies relative to factor models
This figure plots the percentile ranks for 212 anomaly trading strategies in terms of alphas (solid lines), and compares those with the SRDS trading strategy alphas (diamonds). The strategies are constructed using value-weighted quintile sorts using NYSE breakpoints. The alphas include those with respect to the CAPM, Fama and French (1993) three-factor model, Fama and French (1993) three-factor model augmented with the Carhart (1997) momentum factor, Fama and French (2015) five-factor model, and the Fama and French (2015) five-factor model augmented with the Carhart (1997) momentum factor following Fama and French (2018). The left panel plots alphas with no adjustment for trading costs. The right panel plots Novy-Marx and Velikov (2016) net generalized alphas.



Panel A: Pearson



Panel B: Spearman

Figure 5: Distribution of correlations.
This figure plots a name histogram of correlations of 209 filtered anomaly signals with SRDS. The correlations are pooled. Panel A plots Pearson correlations, while Panel B plots Spearman rank correlations.

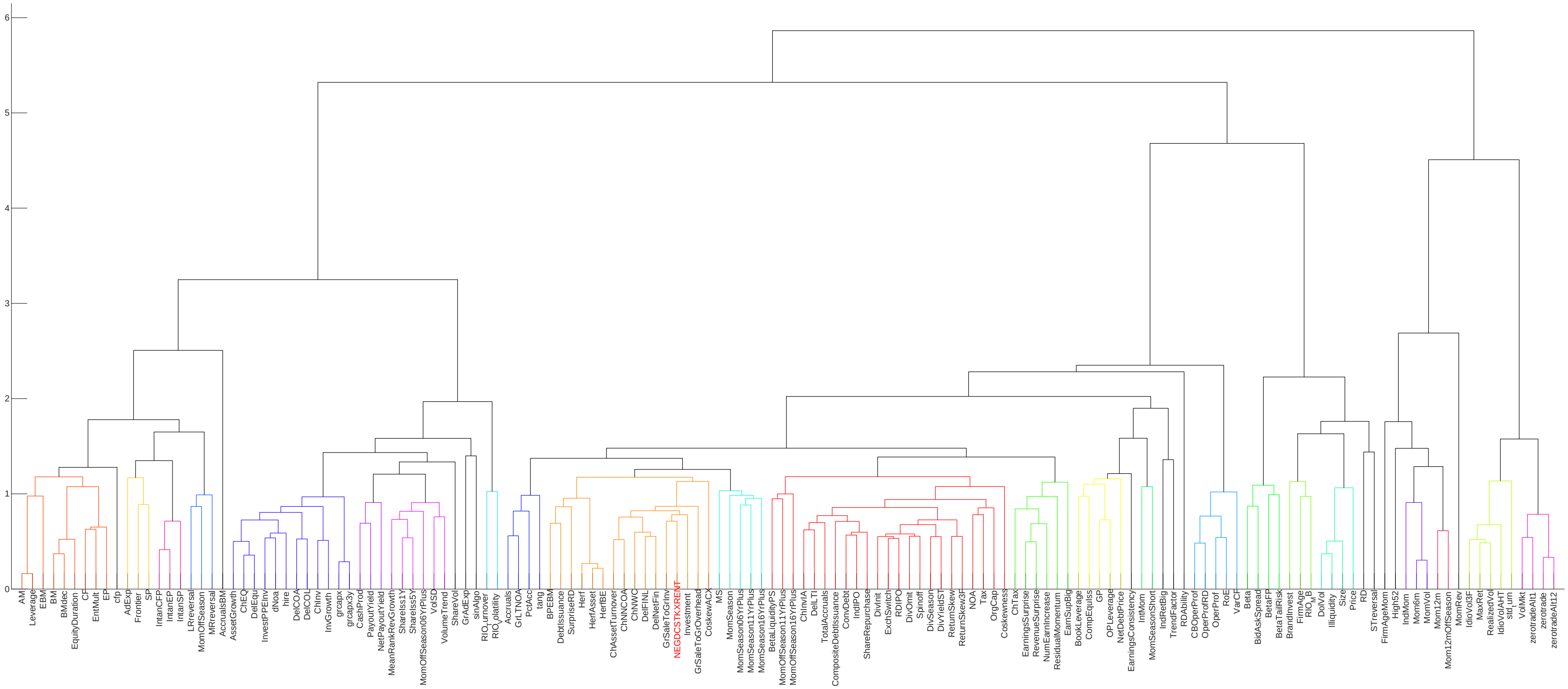


Figure 6: Agglomerative hierarchical cluster plot

This figure plots an agglomerative hierarchical cluster plot using Ward's minimum method and a maximum of 10 clusters.

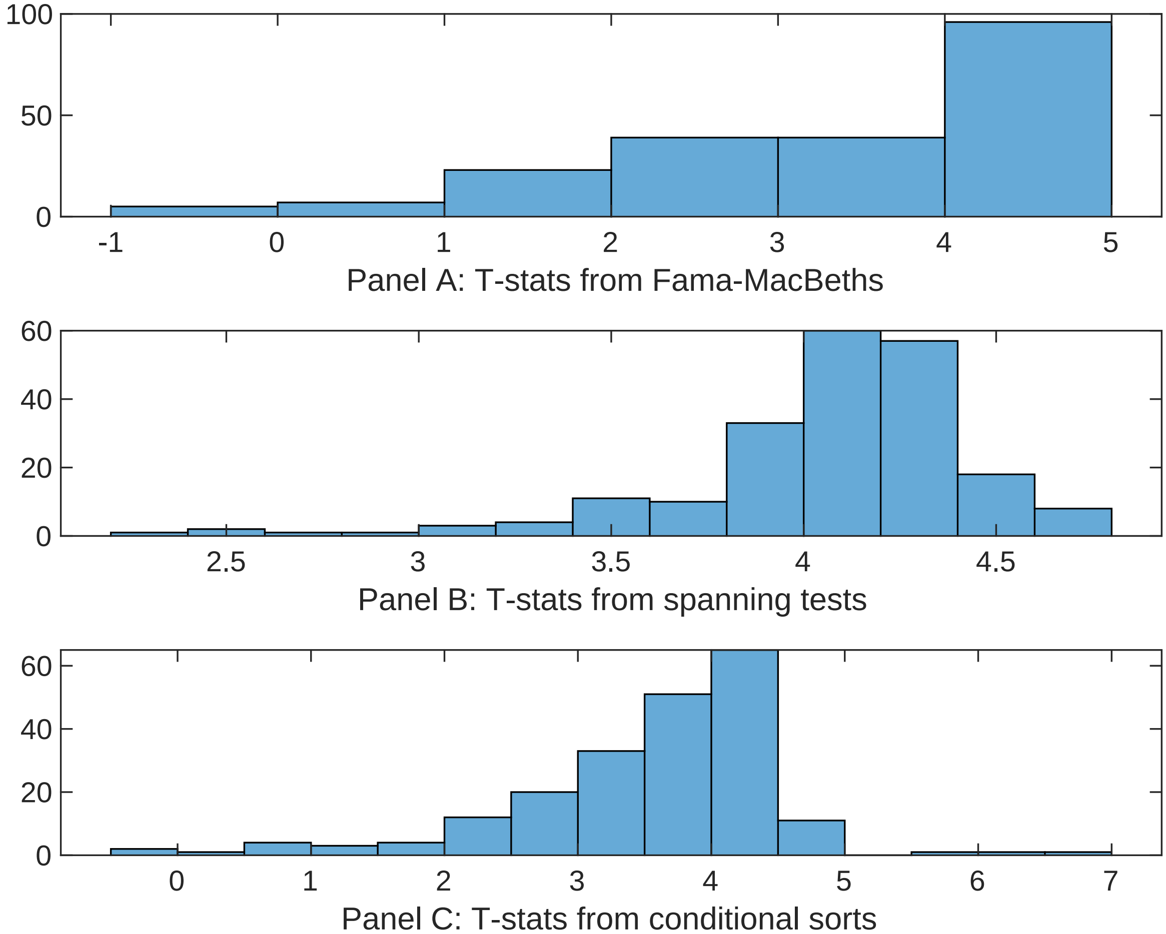


Figure 7: Distribution of t-stats on conditioning strategies
This figure plots histograms of t-statistics for predictability tests of SRDS conditioning on each of the 209 filtered anomaly signals one at a time. Panel A reports t-statistics on β_{SRDS} from Fama-MacBeth regressions of the form $r_{i,t} = \alpha + \beta_{SRDS} SRDS_{i,t} + \beta_X X_{i,t} + \epsilon_{i,t}$, where X stands for one of the 209 filtered anomaly signals at a time. Panel B plots t-statistics on α from spanning tests of the form: $r_{SRDS,t} = \alpha + \beta r_{X,t} + \epsilon_t$, where $r_{X,t}$ stands for the returns to one of the 209 filtered anomaly trading strategies at a time. The strategies employed in the spanning tests are constructed using quintile sorts, value-weighting, and NYSE breakpoints. Panel C plots t-statistics on the average returns to strategies constructed by conditional double sorts. In each month, we sort stocks into quintiles based one of the 209 filtered anomaly signals at a time. Then, within each quintile, we sort stocks into quintiles based on SRDS. Stocks are finally grouped into five SRDS portfolios by combining stocks within each anomaly sorting portfolio. The panel plots the t-statistics on the average returns of these conditional double-sorted SRDS trading strategies conditioned on each of the 209 filtered anomalies.

Table 4: Fama-MacBeths controlling for most closely related anomalies
This table presents Fama-MacBeth results of returns on SRDS. and the six most closely related anomalies. The regressions take the following form: $r_{i,t} = \alpha + \beta_{SRDS} SRDS_{i,t} + \sum_{k=1}^{s} ix\beta_{X_k} X_{i,t}^k + \epsilon_{i,t}$. The six most closely related anomalies, X, are Share issuance (1 year), Growth in book equity, Net Payout Yield, Share issuance (5 year), Change in equity to assets, Asset growth. These anomalies were picked as those with the highest combined rank where the ranks are based on the absolute value of the Spearman correlations in Panel B of Figure 5 and the R^2 from the spanning tests in Figure 7, Panel B. The sample period is 196606 to 202306.

Intercept	0.13	0.18	0.12	0.13	0.13	0.14	0.13
	[5.46]	[7.14]	[5.19]	[5.85]	[5.41]	[5.86]	[5.38]
SRDS	0.48	0.38	0.26	0.51	0.40	0.31	0.24
	[4.01]	[3.12]	[1.85]	[4.32]	[3.18]	[2.49]	[1.76]
Anomaly 1	0.26						0.10
	[5.40]						[2.47]
Anomaly 2		0.52					0.13
		[4.50]					[0.01]
Anomaly 3			0.27				0.22
			[2.36]				[2.00]
Anomaly 4				0.33			0.58
				[3.50]			[0.69]
Anomaly 5					0.15		-0.29
					[4.07]		[-0.49]
Anomaly 6						0.11	0.76
						[8.57]	[6.94]
# months	679	684	679	679	684	684	679
$\bar{R}^2(\%)$	0	0	1	0	0	0	0

Table 5: Spanning tests controlling for most closely related anomalies

This table presents spanning tests results of regressing returns to the SRDS trading strategy on trading strategies exploiting the six most closely related anomalies. The regressions take the following form: $r_t^{SRDS} = \alpha + \sum_{k=1}^{6} \beta_{X_k} r_t^{X_k} + \sum_{j=1}^{6} \beta_{f_j} r_t^{f_j} + \epsilon_t$, where X_k indicates each of the six most-closely related anomalies and f_j indicates the six factors from the Fama and French (2015) five-factor model augmented with the Carhart (1997) momentum factor. The six most closely related anomalies, X, are Share issuance (1 year), Growth in book equity, Net Payout Yield, Share issuance (5 year), Change in equity to assets, Asset growth. These anomalies were picked as those with the highest combined rank where the ranks are based on the absolute value of the Spearman correlations in Panel B of Figure 5 and the R^2 from the spanning tests in Figure 7, Panel B. The sample period is 196606 to 202306.

Intercept	0.21	0.22	0.23	0.20	0.24	0.23	0.20
	[2.58]	[2.81]	[2.81]	[2.45]	[2.98]	[2.78]	[2.51]
Anomaly 1	28.88						20.30
	[7.05]						[4.25]
Anomaly 2		31.35					29.46
		[7.05]					[4.56]
Anomaly 3			17.64				6.51
			[5.61]				[1.80]
Anomaly 4				15.73			0.84
				[3.68]			[0.18]
Anomaly 5					19.57		-6.17
					[4.53]		[-1.02]
Anomaly 6						2.74	-17.25
						[0.50]	[-3.02]
mkt	4.38	3.16	5.03	4.35	1.82	2.13	5.84
	[2.32]	[1.67]	[2.59]	[2.20]	[0.95]	[1.10]	[3.01]
smb	1.93	-0.48	4.09	-0.09	0.26	0.34	3.38
	[0.71]	[-0.18]	[1.46]	[-0.03]	[0.09]	[0.12]	[1.20]
hml	-8.60	-8.68	-11.68	-9.17	-7.49	-5.07	-12.55
	[-2.34]	[-2.37]	[-2.99]	[-2.31]	[-2.00]	[-1.35]	[-3.23]
rmw	-5.91	5.05	-6.35	0.66	5.35	3.34	-5.82
	[-1.51]	[1.37]	[-1.54]	[0.17]	[1.42]	[0.88]	[-1.34]
cma	16.92	-0.45	17.97	26.30	10.29	27.34	14.17
	[2.93]	[-0.07]	[3.00]	[4.59]	[1.46]	[3.17]	[1.68]
umd	3.49	3.44	5.33	3.98	4.37	3.82	2.94
	[1.88]	[1.85]	[2.82]	[2.09]	[2.29]	[1.97]	[1.58]
# months	680	684	680	680	684	684	680
$\bar{R}^2(\%)$	13	12	11	9	9	6	17

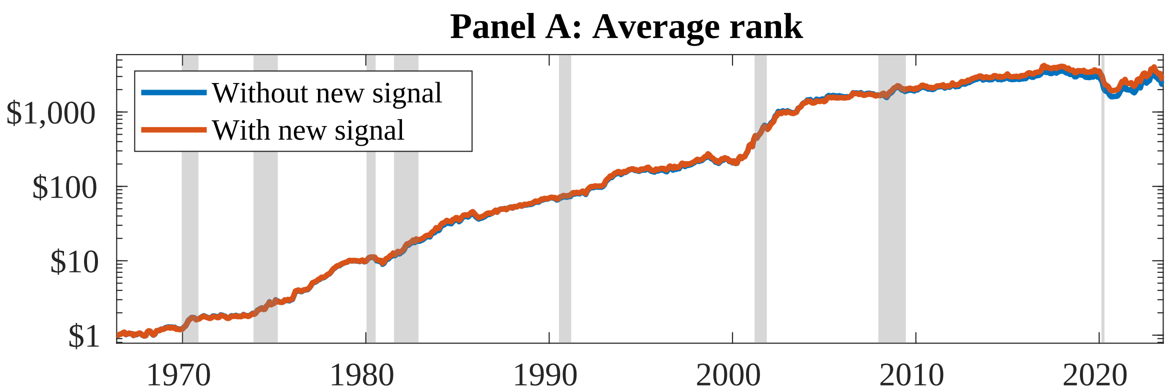


Figure 8: Combination strategy performance
This figure plots the growth of a $1 invested in trading strategies that combine multiple anomalies following Chen and Velikov (2022). In all panels, the blue solid lines indicate combination trading strategies that utilize 155 anomalies. The red solid lines indicate combination trading strategies that utilize the 155 anomalies as well as SRDS. Panel A shows results using "Average rank" as the combination method. See Section 7 for details on the combination methods.

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