Betting Against Beta

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Executive Summary

	Strategy	Low beta stocks are underbought by retail & institutional investors; Buying low-beta stocks may lead to better risk-adjusted returns because these stocks tend to be undervalued.
	Performance	Over 10 years: 273.1% cumulative return, 0.78 Sharpe Ratio, Beta of 0.82, 32.7% 10 Y average turnover Slightly underperformed the S&P(314.7%).
	Recommendation	Do Not Buy Low Beta Strategy

Strategy Rational

Article Title: ["Betting against Beta"]

Key Takeaways:

- Investor constraints push capital into high-beta "lottery" stocks, causing them to become crowded and overpriced.
- Low-beta stocks are often under-owned and undervalued because investors can't lever them to achieve desired returns.
- As a result, low-beta stocks tend to deliver steadier performance and higher risk-adjusted returns over time.

Betting against beta ☆

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Strategy Design

Description
- Investors with shorting & leverage restrictions target high beta stocks to compensate; if we can identify securities overlooked by these investors, we can generate superior risk-adjusted returns

Origin
- The paper was found in The Journal of Financial Economics

Goal
- If we purchase companies with low betas, then we will realize better risk-adjusted returns, because these stocks are often undervalued

Parameters
- Worked to eliminate microcap stocks, modest beta, high free float, limited debt, and sustained EPS growth

Back testing Parameters

Screening Criteria

Parameter	Description	Stock Universe
Market Cap	>$300M	3,417 stocks
Beta	0.8 <= Beta <= 1	717 stocks
Free Float %	95%	344 stocks
Net Debt to Shareholder Equity	<= 20%	132 stocks
T12M Diluted Earnings Per Share	>= 5	32 stocks
Current Price to Earnings Ratio	<= 30	26 stocks
Top 15 Rank Return on Common Equity	N/A	15 stocks

Monte Carlo Simulation

Simulation Model Configuration

Portfolio Type ⓘ	Tickers ⌄
Initial Amount ⓘ	50000 .00
Cashflows ⓘ	No contributions or withdrawals ⌄
Simulation Period in Years ⓘ	30 ⌄
Tax Treatment ⓘ	Pre-tax Returns ⌄
Simulation Model ⓘ	Historical Returns ⌄
Use Full History ⓘ	Yes ⌄
Bootstrap Model ⓘ	Single Year ⌄
Sequence of Returns Risk ⓘ	No Adjustments ⌄
Inflation Model ⓘ	Historical Inflation ⌄
Rebalancing ⓘ	Rebalance quarterly ⌄
Intervals ⓘ	Defaults ⌄

Expected Returns

Expected Annual Return

Percentile	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years
10th Percentile	-4.05%	3.50%	5.93%	8.25%	9.31%	9.95%	10.42%	10.74%
25th Percentile	-0.85%	8.10%	9.59%	10.94%	11.61%	11.96%	12.19%	12.31%
50th Percentile	13.72%	14.38%	14.12%	14.13%	14.12%	14.13%	14.13%	14.10%
75th Percentile	30.66%	20.00%	18.64%	17.32%	16.65%	16.36%	16.12%	15.92%
90th Percentile	33.81%	26.03%	22.97%	20.18%	19.00%	18.35%	17.84%	17.52%

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Expected Losses

Loss Probabilities

Loss	Within Time Period	End of Time Period
>= 2.50%	62.44%	0.00%
>= 5.00%	40.62%	0.00%
>= 7.50%	33.32%	0.00%
>= 10.00%	30.44%	0.00%
>= 12.50%	27.28%	0.00%
>= 15.00%	26.38%	0.00%
>= 17.50%	18.46%	0.00%
>= 20.00%	14.69%	0.00%
>= 22.50%	13.96%	0.00%
>= 25.00%	13.25%	0.00%
>= 27.50%	12.98%	0.00%
>= 30.00%	2.65%	0.00%
>= 32.50%	0.70%	0.00%
>= 35.00%	0.35%	0.00%
>= 37.50%	0.16%	0.00%
>= 40.00%	0.06%	0.00%

Loss is measured against the original portfolio balance.

Back testing Results – Performance

5 YEAR RETURN

Cumulative (Low Beta 5Y) — Cumulative (SPX)

Period	Return	α	β	σ	Max DD	Sharpe
1yr	10.5%	-4.1	0.8	18.98	3.9%	0.44
1yr SPX	17.6%	0	1	11.23	5.2%	1
10yr	273.1%	1.35	0.82	17.69	-24.1%	0.78
10yr SPX	314.7%	0	1	15.29	-24.1%	0.72

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Back testing Results – Performance

10 YEAR RETURN

Legend: Cumulative (Low Beta) — Cumulative (SPX)
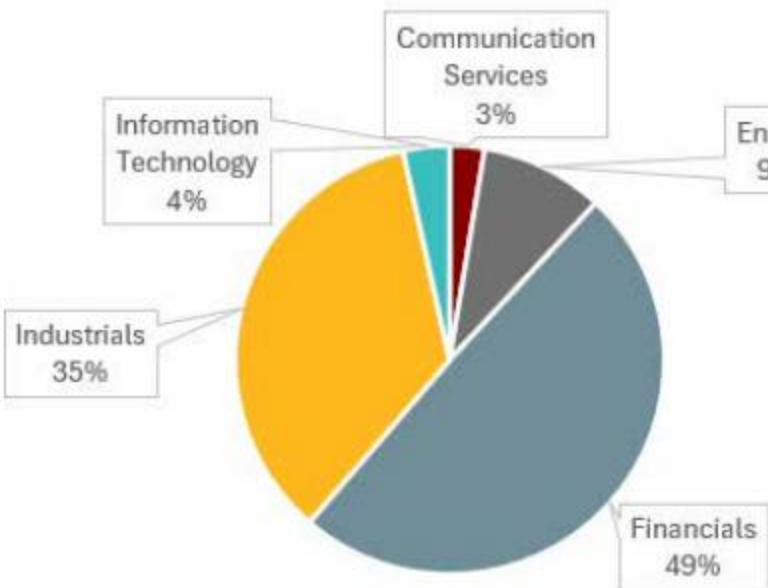
Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Mean
STRAT	2.5%	10.6%	28.4%	1.7%	19.3%	16.7%	35.9%	-13.3%	30.5%	9.0%	8.4%	13.6%
S&P	8.0%	10.9%	21.8%	-5.2%	32.2%	18.0%	29.9%	-18.3%	26.3%	25.5%	14.4%	14.9%

Recommended Purchases
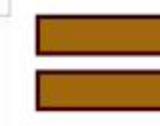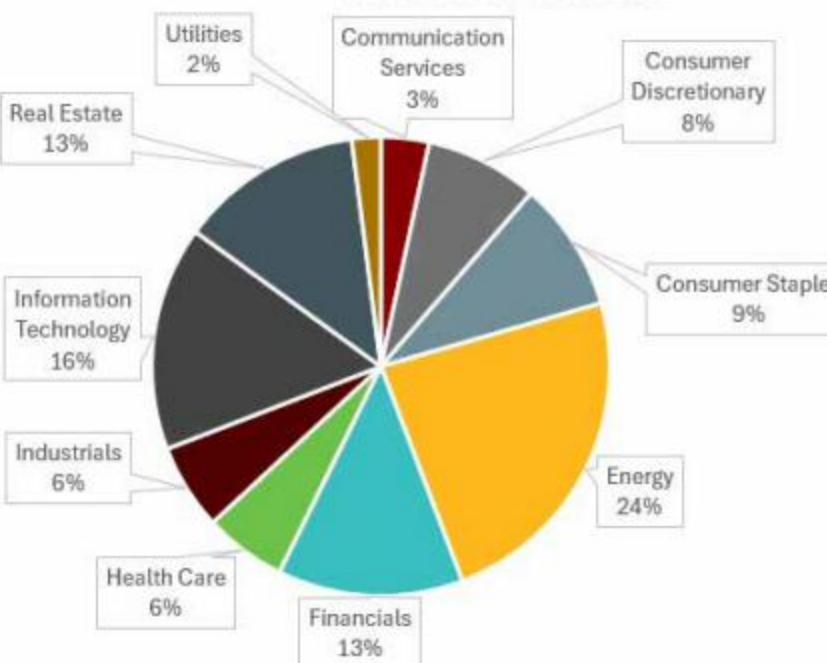
Name	Ticker	P/E Ratio	Monthly Trading Volume ($M)	Market Cap ($B)	Share Price	# of Shares	Total Value
Automatic Data Processing	ADP	23.86	0.807	$118.9	$260.30	12	$3,123.60
Bank of New York	BK	14.61	0.359	$76.8	$107.93	29	$3,129.97
EOG Resources	EOG	10.56	0.579	$61.2	$105.84	32	$3,386.88
Paccar Inc.	PCAR	19.23	0.870	$51.6	$98.40	34	$3,345.60
Resmed Inc.	RMD	22.64	0.270	$40.1	$246.88	13	$3,209.44
Cincinnati Financial Corp.	CINF	21.76	0.455	$24.7	$154.59	22	$3,400.98
Snap-On Inc.	SNA	17.56	0.020	$18.1	$335.55	10	$3,355.50
Expeditors International	EXPD	22.14	0.126	$16.6	$121.90	27	$3,291.30
Houlihan Lokey Inc.	HLI	22.77	0.238	$14.4	$179.08	19	$3,402.52
AtkinsRealis Group Inc.	SNCAF	6.77	0.100	$11.9	$70.67	47	$3,321.49
InterDigital Inc.	IDCC	24.21	0.136	$8.9	$361.96	9	$3,257.64
Essent Group	ESNT	8.49	0.060	$6.3	$60.57	55	$3,331.35
Plexus Corp	PLXS	18.71	0.063	$3.9	$139.90	24	$3,357.60
Lindsay Corp	LNN	18.40	0.009	$1.5	$111.24	30	$3,337.20
QCR Holdings	QCRH	10.08	26,643	$1.3	$74.39	45	$3,347.55

Effect on the Portfolio
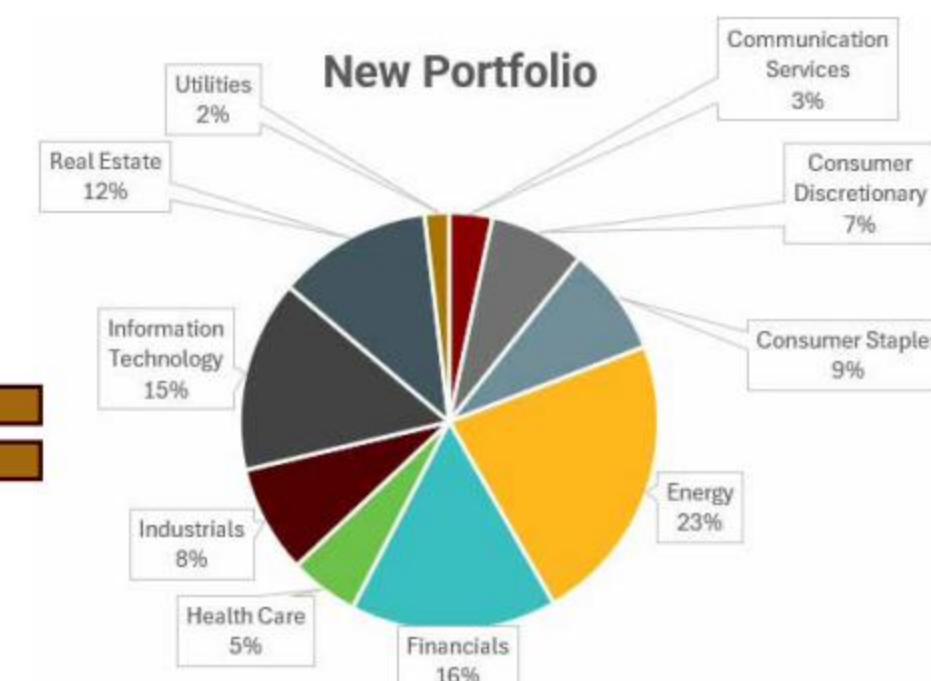
Proposed Investment Sectors

- Communication Services 3%
- Information Technology 4%
- Energy 9%
- Industrials 35%
- Financials 49%

Current Portfolio

- Utilities 2%
- Communication Services 3%
- Consumer Discretionary 8%
- Real Estate 13%
- Consumer Staples 9%
- Information Technology 16%
- Energy 24%
- Industrials 6%
- Health Care 6%
- Financials 13%

New Portfolio

- Utilities 2%
- Communication Services 3%
- Consumer Discretionary 7%
- Real Estate 12%
- Consumer Staples 9%
- Information Technology 15%
- Energy 23%
- Industrials 8%
- Health Care 5%
- Financials 16%

Portfolio	Exp. Return	St. Dev	Beta	Sharpe Ratio	Idio. Risk	Info. Ratio
Existing	19.00%	6.78%	0.79	-0.40	8.47%	-3.62
Adjusted						

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Risks

"Betting against Beta" is primarily a hedge strategy that includes long on low beta stocks and shorts on high beta stocks, which ultimately was not possible within MSIF.

Risk Category	Specific Risks	Mitigations
Model & Research	Difficult to form firm thesis from literature in a way that fits our fund	Collaborative approach to criteria definition
Data & Assumptions	Strategy was not fully replicable	Raised beta parameters
Portfolio	Saw deviation from large-cap low beta value stocks to medium-cap, higher volatility stocks in recent rebalances	Adjust diluted EPS growth and Debt to Equity

Summary & Recommendation

Strategy Merits

- **Performance**

  Underperformed S&P with more risk, lower alpha; not attractive in the current market environment.

- **Risk**

  Strong downside protection, but upside is too limited in a risk-on environment

- **Effects on Portfolio**

  Would reduce fund beta and constrain upside; not aligned with fund objectives

Action Plan

- **Recommendation**: **Not to invest in this strategy**