Not Just the Weakest Link: A Closer Look at Portfolio Effects between Sectors

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Abstract
Systematic trading strategies typically trade a variety of markets covering several different sectors. When analyzing portfolio performance, PnL is often reported on a sector level. Naturally, performance will differ between sectors, and when viewed on a standalone basis, some sectors may seem to detract from the portfolio. In this note we illustrate how adding markets in such a sector may be beneficial nonetheless, if performance at the portfolio level is considered.

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1. Introduction

When building a systematic trading strategy, trading a range of markets from different sectors allows the portfolio to benefit from diversification. Not all markets behave statistically the same, however, with their returns showing different means, degrees of skew, and presence or absence of fat tails. While this can imply that certain trading strategies are more successful for some markets or sectors, the performance of a sector on a standalone basis is a poor criterion on which to base its inclusion or exclusion. Rather, the effect on the overall portfolio should be considered, especially if an optimization layer is employed.

2. A Simple Trend-Following Signal

One well-known systematic trading signal is trend-following: buy/sell the asset when prices have been going up/down. While there are various formulations, see Bethke et al. (2018), for illustrative purposes we use a generic 20 x 120 day moving average crossover. Positions are generated by feeding this signal through a mean-variance optimization ("MVO"), targeting a constant risk of 10% and enforcing market bounds. The MVO uses the trend signal and a 6-month correlation matrix to maximize the portfolio return for the given risk target. Our data covers the period January 2015 through May 2024 and we trade 55 global futures markets. Results are gross, before costs and fees (net results are qualitatively the same). Figure 1 shows overall and sector PnL, where we abbreviate sectors: AS for Agriculturals and Softs, EQ for Equities, EN for Energy, FI for Fixed Income, FX for Foreign Exchange, and ME for Metals. We find an information ratio (IR) of 0.81. The best-performing sectors are equities and fixed income, which are also the largest by number of markets. Sector IRs are shown in Table 1, and – for this backtest – we find the weakest sector to be Energy, with negative sector PnL and IR.

Sector	AS	EQ	EN	FI	FX	ME	Overall
IR	-0.02	0.81	-0.10	0.32	0.24	0.30	0.81

Table 1. Sector and overall information ratios (IR) for a stylized trend-following strategy over the period 2015 to 2024.
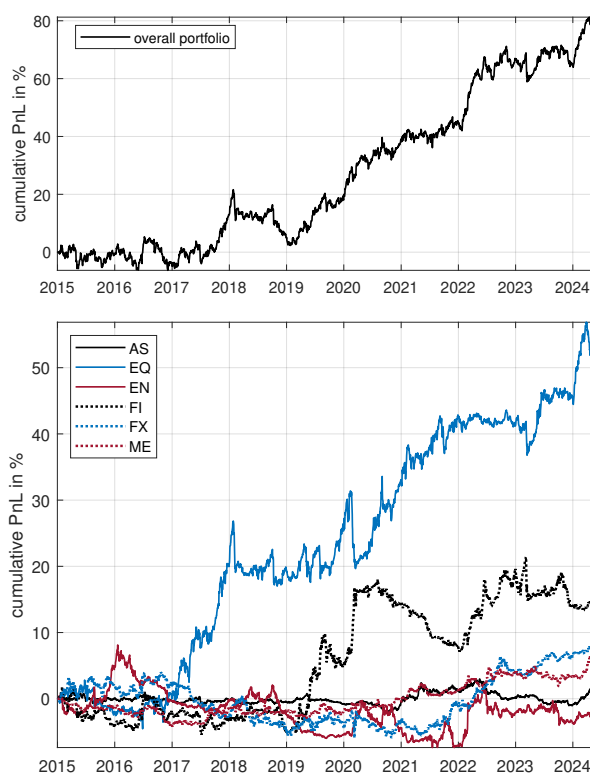

Figure 1. Overall and sector PnL for a stylized trend-following strategy over the period 2015 to 2024.

3. Energy - In or Out?

Looking at the Energy PnL as a hypothetical investor, one might ask why one should trade the sector at all. Aside from the dangers of cherry-picking markets (or parameters) based on a single backtest, there are subtle reasons for including them even if they seem not to be profitable standalone. Despite Energy's negative standalone PnL, its removal hurts overall performance slightly, see the cumulative PnL in the top plot of Figure 2. The IR is reduced from 0.81 to 0.79, and the average drawdown goes from 12.1% to 13.4%, its length increasing from 279 to 299 days, see Table 2.

Markets	IR	Avg. DD Depth	Avg. DD Length
All	0.81	12.1%	279 days
No Energy	0.79	13.4%	299 days

Table 2. Trend-follower performance with and without Energy.
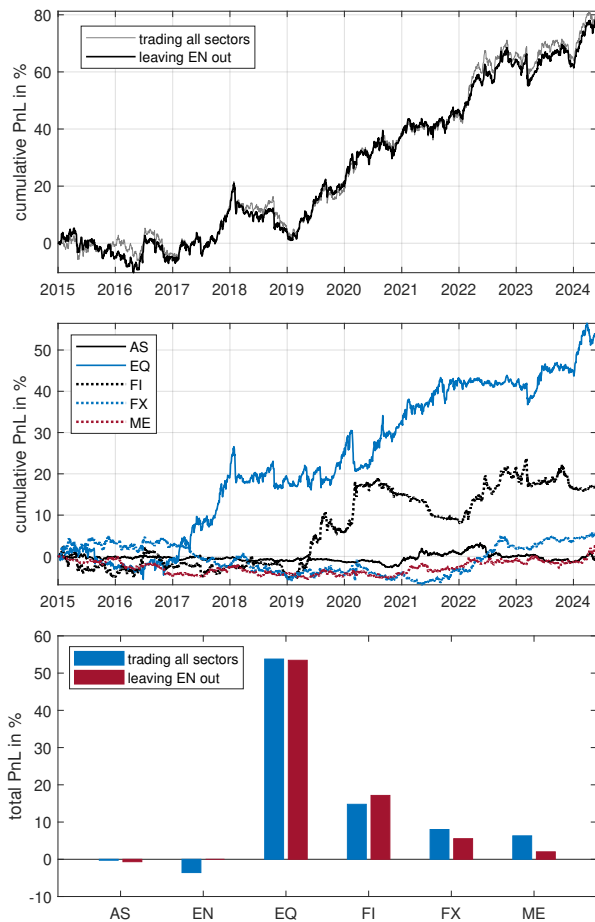
Figure 2. Trend-follower PnL with and without Energy.
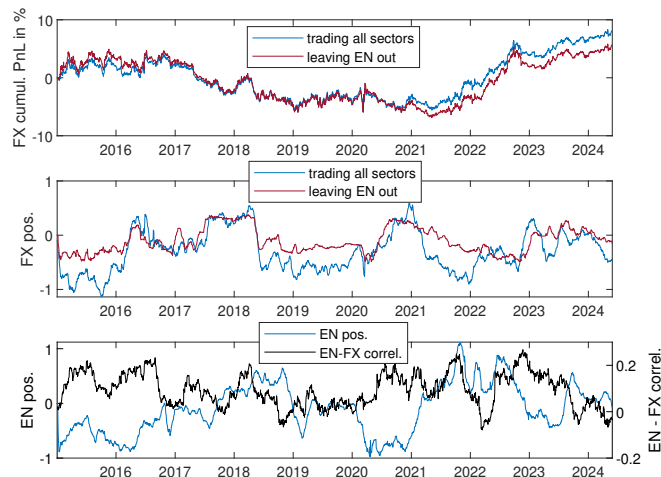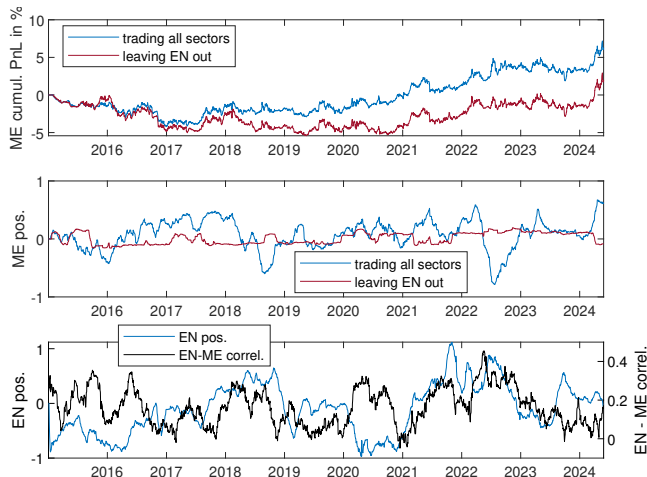
4. Zooming In

Our backtest demonstrates the benefits of trading a sector despite lackluster standalone performance. To understand this effect, we focus on Metals and FX, for which the Energy removal has the largest relative impact, see their reduction in sector PnL in the bottom plot of Figure 2. Figure 3 plots aggregate sector PnL, positioning and inter-sector correlations for Metals and FX. For both Metals and FX, we find that including Energy leads to larger absolute sector positions and more dynamic changes. The correlation between Metals and Energy is mostly positive, and large in early 2020: with the Energy position negative (short), the sector acts as a hedge to Metals, and the MVO amplifies the positive (long) Metals position. The MVO may find it beneficial to flip the position, e.g. for Metals in mid-2022 where the originally small positive position is turned into a large negative one. FX and Energy also often display positive correlation. In 2021 the aggregate Energy position is long, hedging the mostly short Metals position, which is established faster and amplified by the MVO. Going into 2023, a short Energy position allows the MVO to increase its long on Metals. With correlations changing, hedge effects shift within the portfolio. Not every hedge will be successful, but overall we find performance improvements when the portfolio layer has more assets to act on.

5. Conclusion

In this note we have illustrated how adding potentially non-profitable markets to a trading strategy can still be beneficial at the portfolio level, as those markets can act as hedges that allow the portfolio layer to shift and/or offset risk in its pursuit of an optimal risk-return tradeoff.

References

N. Bethke, D. DeWoskin, G. Dean, and E. Forseth. The Speed of Trend-Following. Research Note, Graham Capital Management, March 2018.

Figure 3. Cumulative PnL, positioning and correlation to Energy for Metals and FX. Also shown is the Energy positioning.

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