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A Simple Rotation Strategy with Sector ETFs

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Abstract

In this paper we consider a simple strategy to construct portfolios from 9 sector ETFs that represent major sectors of the S&P 500. The portfolio is rebalanced every month by choosing the middle 3 ETFs based on price returns from the previous month. Through extensive analysis, we show that such rotation strategy with the 3-middle performers and monthly rebalancing outperforms S&P 500 both by total return, risk, and maximum drawdown. This simple rotation strategy can be implemented by a self-directed investor without any additional tools.

Introduction

In recent years, sector ETFs have been widely used to provide diversification and in portfolio construction. Portfolio managers that chose to use a sector-based strategy to gain performance edge may have different focus. Some may invest in business cycles while others may target in a particular industry (e.g. [1]). Sector rebalancing is performed by portfolio managers, and this may involve extensive analysis (e.g. [2]). This may be challenging for individual investors. In this article, we discuss a simple sector rotation strategy that outperforms the S&P 500 and can be easily implemented by any self-directed investor.

Proposed Rotation Strategy

For our portfolio construction strategy, we consider 9 SPDR ETFs: Consumer Discretionary (XLY), Financial (XLF), Materials (XLB), Consumer Staples (XLP), Health Care (XLV), Utilities (XLU), Industrial (XLI), Technology (XLK), and Energy (XLE). Collectively, these ETFs comprise most stocks of the S&P 500. The data we used for the analysis is daily price for year 2001 to 2020 from Yahoo Finance.

Our rotation strategy is to construct an equally weighted portfolio using some of the ETFs. Despite of the simplicity of such strategies, equal weight strategies, in general, are known to give stable performance for all periods, are easy to implement, and are often difficult to outperform [3]. Our strategy considers equal weight investing in the middle performers among

the 9 ETFs. Unlike the strategy that invests in the single middle performer ETF suggested by Marisa Yang [4], we consider investing in the group of k middle ETFs.

Performance Ratios (2001 – 2020)						
Portfolio	Final Portfolio Value*	Avg Return	Avg Risk Adj Return	Volatility	Sharpe Ratio	MaxDD
Mid-1 ETF	432	7.60%	6.14%	19.15%	0.32	56.52%
Mid-3 ETF	739	10.52%	9.03%	15.46%	0.58	45.81%
Mid-5 ETF	618	9.54%	8.06%	14.46%	0.56	40.22%
Mid-7 ETF	510	8.49%	7.03%	14.83%	0.47	44.83%
Equal-Weight	460	7.92%	6.47%	14.92%	0.43	49.12%
S&P 500 (SPY)	419	7.43%	5.98%	15.11%	0.40	50.78%

TABLE 1: COMPARISON OF THE OVERALL PERFORMANCE ACROSS DIFFERENT MOMENTUM STRATEGIES, EQUAL-WEIGHT, AND SPY

**Assume we start with \$100 in 2001*

The rotation strategy is as follow: on last trading day of each month, we rank sector ETFs based on their percentage price appreciation for that month. We then buy the middle-ranked 1, 3, 5 or 7 sectors (equally weighted) and own them for the next month. These middle-ranked sectors are the “Mid-Momentum” sectors (Mid-1, Mid-3, Mid-5, and Mid-7 refers to the number of middle performers to be included in the portfolio). We then computed the annualized return, volatility, Sharpe Ratio, and maximum drawdown (MaxDD) for each portfolio for the investment period. For comparison analysis purpose, we also added the same performance metrics for a monthly-rebalanced equal-weighted portfolio that holds all 9 sectors at all times, as well as S&P 500 (SPY) as the market benchmark. Through extensive analysis, we found that the optimal k is 3, and the optimal rebalance frequency is 1 month. Our results are summarized in table 1. A complete table that shows performance ratios for 3 different rebalance frequencies can be found in the Appendix.

The Middle 3 Performers Gave the Best Results

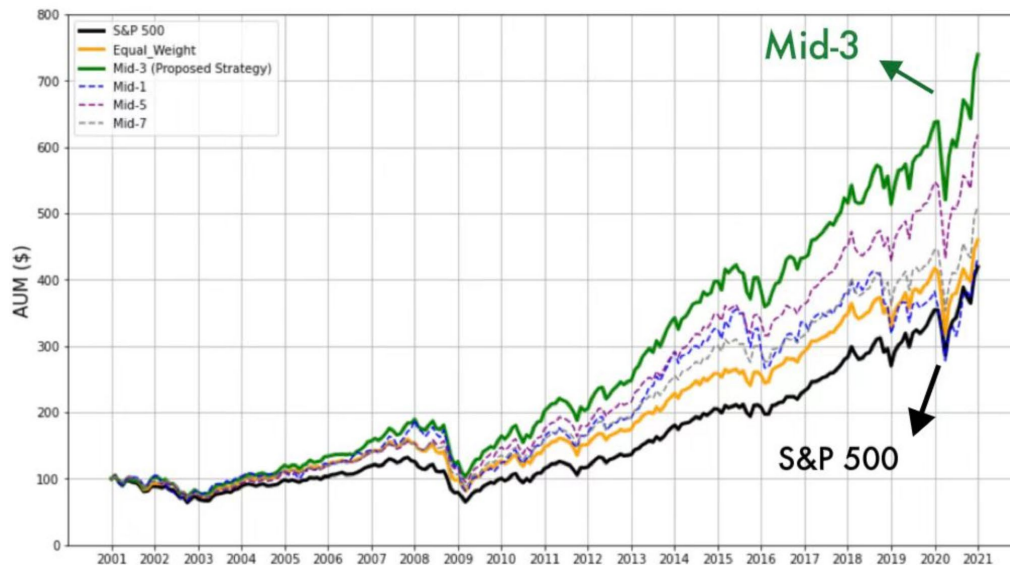


FIGURE 1: HYPOTHETICAL PORTFOLIO VALUE GROWTH FROM 2001-2020 WITH \$100 AS STARTING VALUE UNDER DIFFERENT STRATEGY VS. S&P 500 (WITHOUT TAX AND TRANSACTION COST CONSIDERATION)

As presented in both table 1 and the figure 1, all the portfolios outperformed SPY in terms of annualized return. However, the 1-ETF portfolio underperformed in all other metrics – it has the largest annual volatility 19.15% and MaxDD 56.52%. This was expected since that strategy only invested in a single sector at the time. Adding more ETFs to the portfolio seems to be the solution for it. We can see that, portfolios investing in 3, 5, or 7 ETFs have significantly lower volatility, and they all outperformed the single ETF portfolio on all metrics.

However, adding more ETFs did not always result in better performance, not to mention the additional complexity and transaction costs for a self-directed investor. Table 1 shows that, investing in the middle 3 performers is probably your best shot. It gave an annualized return of 9.03%, outperforming S&P by more than 300 bps. In terms of total portfolio value, after 20 years, the 3-ETFs portfolio would grow from a \$100 starting value to \$739, whereas the buy-and-hold strategy for S&P 500 will only grow to \$419. This means that even after adjusting for transaction costs, this strategy is still superior to passive investing in the index. In terms of tax implications, this strategy is most attractive for deferred-tax account.

In terms of the maximum drawdown, although the mid-3 strategy is not as good as mid-5 and mid-7, it's still better than equal weight and S&P. In addition, both mid-5 and mid-7 strategies have lower average return, with the mid-5 is about 100 bps lower and the mid-7 is more than 200 bps lower. On the other side, investing in a single ETF gave an almost 300 bps lower average return, a much higher risk and MaxDD than the other 3 strategies with more ETFs.

In addition, the equal-weighted strategy has also outperformed the SPY on all metrics. This could be a great alternative for investors who value simplicity as they can simply re-weight all 9 sectors at the beginning of each period without having to compute and rank the performance.

How Did the Strategy Invest in Economic Cycle?

In general, the performance of sectors is largely tied to the economic cycle. In other words, some sectors generally perform well, and other sectors perform poorly during certain point of the economic cycle. For example, investors turn to sectors like Consumer Staples (XLP), Health Care (XLV) and Utilities (XLU) to outperform during an economic recession. These sectors are defensively oriented (generally referred as “defensive sectors”). On the other hand, sectors like Consumer Discretionary (XLY), Financial (XLF), Materials (XLB) are the economically sensitive areas, which investors can use to outperform during phases of economic expansion.

In the following section, we will take a closer look at the best performing strategy and see it was able to capitalize on the economic cycle by simply investing in the middle 3 performing sectors. First, we label each monthly period from 2001 to 2020 as either “contraction” or “expansion” according to the Business Cycle Reference Dates provided by the National Bureau.

From	To	Economic Phase
Jan 2001	Nov 2001	Contraction
Dec 2001	Dec 2007	Expansion
Jan 2008	June 2009	Contraction
Jul 2009	Jan 2020	Expansion
Feb 2020	Apr 2020	Contraction
May 2020	Dec 2020	Expansion

TABLE 2: US BUSINESS CYCLE EXPANSION AND CONTRACTION

Source: <https://www.nber.org/research/data/us-business-cycle-expansions-and-contractions>

Each of the 9 sectors is then classified into 1 of the 3 super sectors: **Defensive**, **Sensitive** and **Cyclical**. Sectors fall under Defensive super sector are the least economically sensitive areas; the Cyclical sectors are industries that generally flow with the overall economy; the Sensitive sectors fall between the two.

Defensive: Consumer Staples (XLP), Health Care (XLV), Utilities (XLU)

Sensitive: Industrial (XLI), Technology (XLK), and Energy (XLE)

Cyclical: Consumer Discretionary (XLY), Financial (XLF), Materials (XLB)

***According to Morningstar Stock Sector Structure on Australian Stock Market*

Portfolio Composition			Frequency		Relative Frequency	
Defensive	Sensitive	Cyclical	Contraction	Expansion	Contraction	Expansion
1	1	1	11	75	35.48%	35.89%
3	0	0	0	2	0.00%	0.96%
2	1	0	3	15	9.68%	7.18%
2	0	1	4	21	12.90%	10.05%
1	2	0	4	18	12.90%	8.61%

1	0	2	3	19	9.68%	9.09%
0	3	0	0	2	0.00%	0.96%
0	2	1	4	25	12.90%	11.96%
0	1	2	2	31	6.45%	14.83%
0	0	3	0	1	0.00%	0.48%
TOTAL			31	209	100.00%	100.00%

TABLE 3: ABSOLUTE AND RELATED FREQUENCY OF THE 10 DIFFERENT PORTFOLIO COMPOSITIONS DURING THE CONTRACTION AND EXPANSION PHASE FOR THE YEAR 2001-2020

Since the strategy invests in the middle 3 performers, there are 10 possible compositions of super sectors for each period, as illustrated in table 3 below. For example, the 3 selected ETFs could be all from the same super sector, or each from a different super sector, etc. We then count the occurrence and compute the relative frequency for each composition for the time horizon, grouped by economic phase (contraction or expansion). The results are summarized in Table 3.

In table 3, we can see that our proposed rotation strategy has invested in all 3 super sectors for the largest number of periods during both recession and expansion phases (35.48% and 35.89% relative frequencies). For 7 out of the 31 months (22.58% relative frequency) of the economic contraction phases, the strategy has invested in 2 or more defensive ETFs, versus 38 out of 209 months (18.18% relative frequency) during economic expansion. On the other hand, the relative frequency of the strategy owning 2 or more sensitive or cyclical ETFs during periods of economic contraction is 41.94% versus 45.93% during periods of economic expansion. Moreover, the relative frequency of owning at least 2 cyclical sectors is 16.13% during economic contraction, versus 24.40% during economic expansion. Interestingly, our proposed strategy has invested in a single super sector less than 3% of the time (5 months out of 20 years), regardless of the economic phases. This means that our proposed strategy almost always provides some level of diversification across the 3 super sectors.

Conclusion

In this study, we show that monthly construction of the equal weighted portfolio using the middle 3 performing ETFs gives a simple strategy that outperforms both S&P 500 and other equally weighted sector ETF portfolios. The proposed strategy can be implemented by any self-directed investors without any additional tools. It would be especially attractive for tax-deferred and retirement accounts.

Appendix

Performance Ratios (2001 - 2020)						
Strategy	Reb Freq	Avg RA Return	Ann RA Return	Volatility	Sharpe Ratio	MaxDD
S&P 500 (SPY)		7.43%	5.98%	15.11%	0.40	50.78%
Mid-1 ETF	1-M	7.60%	6.14%	19.15%	0.32	56.52%
	3-M	6.98%	5.53%	19.21%	0.29	50.52%
	6-M	8.91%	7.44%	15.76%	0.47	51.92%
Mid-3 ETF	1-M	10.52%	9.03%	15.46%	0.58	45.81%
	3-M	8.18%	6.72%	15.73%	0.43	41.39%
	6-M	7.57%	6.12%	13.96%	0.44	40.63%
Mid-5 ETF	1-M	9.54%	8.06%	14.46%	0.56	40.22%
	3-M	8.08%	6.63%	15.09%	0.44	40.49%
	6-M	7.23%	5.79%	14.12%	0.41	43.78%
Mid-7 ETF	1-M	8.49%	7.03%	14.83%	0.47	44.83%
	3-M	8.01%	6.55%	14.79%	0.44	46.53%
	6-M	7.53%	6.08%	14.56%	0.42	46.60%
Equal-Weight	1-M	7.92%	6.47%	14.92%	0.43	49.12%
	3-M	7.96%	6.50%	14.86%	0.44	48.74%
	6-M	7.86%	6.40%	14.75%	0.43	48.51%

TABLE A1: COMPARISON OF THE OVERALL PERFORMANCE ACROSS DIFFERENT MOMENTUM STRATEGIES, EQUAL-WEIGHT, AND SPY WITH 1-MONTH, 3-MONTH AND 6-MONTH REBALANCE FREQUENCY.

Reference

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