Objective:

To construct a portfolio:

1. Consists of financial instruments with negative correlation in order to deliver positive return both in bull and bear market.
2. Preliminary Long the U.S equity market by leverage ETF (UDOW: three times (3x) the daily performance of the Dow Jones Industrial Average).
3. Hedge the risk by shorting energy commodity futures (crude oil futures and nature gas futures) through leverage ETF (DTO: daily short crude oil futures ETF, KOLD: daily short natural gas futures ETF)
4. Exploit the price between ERX and DTO by mean reversion (any suggestion is strongly appreciate).
5. Exploit the price between ERX and KOLD by time series analysis (any suggestion is strongly appreciate).
6. Construct the optimal way to rebalancing these four financial instruments after calculating risk/ reward.

Supporting Evidence:

1. The daily, monthly, and annually correlation of ERX and DTO:

Daily: -0.67 source from (<https://www.portfoliovisualizer.com/asset-correlations?s=y&symbols=DTO%2C+ERX&endDate=06%2F10%2F2018&timePeriod=1&numTradingDays=60>)

Monthly: -0.70 source form (<https://www.portfoliovisualizer.com/asset-correlations?s=y&symbols=DTO%2C+ERX&endDate=06%2F10%2F2018&timePeriod=2&numTradingDays=60>)

Annual: -0.66 source form (<https://www.portfoliovisualizer.com/asset-correlations?s=y&symbols=DTO%2C+ERX&endDate=05%2F31%2F2018&timePeriod=4&numTradingDays=60>)

Conclusion/ though: Note that ERX is the 3 times daily leverage ETF while DTO is the 2 times daily leverage short crude oil ETF. Common finical knowledge that energy sector (energy stocks) has strong correlation to the underlying commodity (crude oil and natural gas). We can see from this chart that the daily, monthly, and annually correlation has no difference statistically significantly, which we conclude (my though: energy sector stock ETF and crude oil futures react to each other efficiently in a timing manner)

1. The daily, monthly, and annually correlation of ERX and KOLD:

Daily: -0.11 source form (<https://www.portfoliovisualizer.com/asset-correlations?s=y&symbols=ERX%2C+KOLD&endDate=12%2F31%2F2017&timePeriod=1&numTradingDays=60>)

Monthly: -0.15 source form (<https://www.portfoliovisualizer.com/asset-correlations?s=y&symbols=ERX%2C+KOLD&endDate=12%2F31%2F2017&timePeriod=2&numTradingDays=60>)

Annually: -0.87 source form (<https://www.portfoliovisualizer.com/asset-correlations?s=y&symbols=ERX%2C+KOLD&endDate=12%2F31%2F2017&timePeriod=4&numTradingDays=60>)

Conclusion/ though: Note that ERX is the 3 times daily leverage ETF while KOLD is the 2 times daily leverage short natural gas futures. Common finical knowledge that energy sector (energy stocks) has strong correlation to the underlying commodity (crude oil and natural gas). Now we see the absolute value of daily, monthly, and annually correlation increasing. My thought (either ERX lag behind KOLD or vice versa)

P.S My though/ what I know: I discover that if I

1. The daily, monthly, and annually correlation of UDOW and DTO:

Daily: -0.39 source from (<https://www.portfoliovisualizer.com/asset-correlations?s=y&symbols=UDOW%2C+DTO&endDate=12%2F31%2F2017&timePeriod=1&numTradingDays=60>)

Monthly: -0.47 source from (<https://www.portfoliovisualizer.com/asset-correlations?s=y&symbols=UDOW%2C+DTO&endDate=12%2F31%2F2017&timePeriod=2&numTradingDays=60>)

Annually: -0.52 source form (<https://www.portfoliovisualizer.com/asset-correlations?s=y&symbols=UDOW%2C+DTO&endDate=12%2F31%2F2017&timePeriod=4&numTradingDays=60>)

1. The daily, monthly, and annually correlation of UDOW and KOLD:

Daily: 0.02 source form (<https://www.portfoliovisualizer.com/asset-correlations?s=y&symbols=UDOW%2C+DGAZ&endDate=12%2F31%2F2017&timePeriod=1&numTradingDays=60>)

Monthly: 0.01 source form (<https://www.portfoliovisualizer.com/asset-correlations?s=y&symbols=UDOW%2C+DGAZ&endDate=12%2F31%2F2017&timePeriod=2&numTradingDays=60>)

Annually: -0.16 source form (<https://www.portfoliovisualizer.com/asset-correlations?s=y&symbols=UDOW%2C+DGAZ&endDate=12%2F31%2F2017&timePeriod=4&numTradingDays=60>)

1. The daily, monthly, and annually correlation of UDOW and ERX:

Daily: 0.77 source from (<https://www.portfoliovisualizer.com/asset-correlations?s=y&symbols=UDOW%2C+ERX&endDate=06%2F10%2F2018&timePeriod=1&numTradingDays=60>)

Monthly: 0.72 source from (<https://www.portfoliovisualizer.com/asset-correlations?s=y&symbols=UDOW%2C+ERX&endDate=06%2F10%2F2018&timePeriod=2&numTradingDays=60>)

Annually: 0.66 source form (<https://www.portfoliovisualizer.com/asset-correlations?s=y&symbols=UDOW%2C+ERX&endDate=05%2F31%2F2018&timePeriod=4&numTradingDays=60>)

1. The daily, monthly, and annually correlation of KOLD and DTO:

Daily: 0.14 source from (<https://www.portfoliovisualizer.com/asset-correlations?s=y&symbols=KOLD%2C+DTO&endDate=12%2F31%2F2017&timePeriod=1&numTradingDays=60>)

Monthly: 0.18 source from (<https://www.portfoliovisualizer.com/asset-correlations?s=y&symbols=KOLD%2C+DTO&endDate=12%2F31%2F2017&timePeriod=2&numTradingDays=60>)

Yearly: 0.47 source form (<https://www.portfoliovisualizer.com/asset-correlations?s=y&symbols=KOLD%2C+DTO&endDate=12%2F31%2F2017&timePeriod=4&numTradingDays=60>)

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| --- | --- | --- | --- | --- |
|  | UDOW | ERX | DTO | KOLD |
| UDOW | (1,1,1) | (.77,.72,.66) | (-.39,-.47,-.52) | (.02,.01,-.16) |
| ERX | (.77,.72,.66) | (1,1,1) | (-.67,-.70,-.66) | (-.11,-.15,-.87) |
| DTO | (-.39,-.47,-.52) | (-.67,-.70,-.66) | (1,1,1) | (.14,.18,.47) |
| KOLD | (.02,.01,-.16) | (-.11,-.15,-.87) | (.14,.18,.47) | (1,1,1) |