Cypto Pair Trading Strategy Executive Summary

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The historical correlation of two securities serves as the foundation for a pairs trade strategy. A pairs trade requires a strong positive correlation between the securities. The pair trading strategy is based on the assumption that two correlated assets will fluctuate between being in and out of equilibrium. A position is opened when the assets are out of equilibrium and closed when they are back in equilibrium. The key to the strategy is relying on the high degree of correlation that the two stocks will continue to exhibit. A pairs strategy runs the risk of the assets losing their correlation if or when it happens.

The pairs trading strategy has two key mathematical components. Identifying the tradable asset pair. Producing the signal when the assets are out of equilibrium.

The goal is to determine statistically when two different time series are similar. From a qualitative perspective, we can say that assets from the same sector are very similar. For example, ETH and stETH. These two are very similar assets in the crypto market. In this project, I focus mainly on the crypto market and aiming to find out the most profitable pairs by brute force. The candidate assets are picked based on market cap provided in CoinMarketCap. The top ten cryptos are selected, as we believe they have higher liquidity and less market manipulation.

To select the best pair, I enhanced the program by adding White Reality Check to the loop. White's Reality Check (WRC) was invented and patented by economist H. White, a professor at the University of California at San Diego. It will check if the rule return is obtained by chance or not. Moreover, I have reorganized to code to be objected orientated to make it easier to enable crypto trading.

Results

The trading pairs filtered by sharpe ratio and White Reality Check achieve an amazing result. From the equity plot, we can observe that most of the pairs are stable with very small drawback. Moreover, after filtering, all the pairs left are stable coin pairs or coin that belongs to the same family. For example, USDC – USDT, BUSD -USDC, or WBTC -BTC or ETH - stETH. These results are coherent to our rationale, as stable coins and same family coins should have a higher correlation and cointegration, and make it easier to determine whether the spread is overvalued or undervalued.