CTC22

Monday, 24 October 2022 2:04 PM

Portfolio Management: Markowitz Model with input = (Exp Return, Vol, Risk Free rate), Output = Weights and Optimal Sharpe

Q: From historical day to day price data, obtain weights to optimise Sharpe ratio (Python).

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| Our interesting idea | higher penalty on more volatile stocks, using weekly data for expected return instead of daily data |
| Winner's idea | multiply Expected Return by company's relative size in market cap, use a nonzero risk free rate |
| Learning Point | Size premiums matter (Bigger size companies should be weighted more heavily). See Fama French Five Factor model |

Options: ~~Use Black-Scholes to accurately price options and identify mispricing~~ Exploiting the backtester's "free money" when we short a stock or sell a call option

Q: From historical minute to minute price data, trade to maximise PnL on a capital of $100k (Python)

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| Our interesting idea | Buy calls and sell stock according to option's Delta (aka Delta hedging); use free money to buy "statistical arbitrage opportunities" aka when Black Scholes suggests a disparity in Implied Volatility |
| What failed | The training backtester displayed free cash flow as PnL, somehow did not fully internalise our shorted capital, and we didn’t realise we picked the wrong side to short  Implied Volatility isn't a guaranteed arbitrage, only a statistical one, and the arb spreads were too small to make any good money |
| Winner's idea | Sell calls and buy stock; sell calls that will not expire ITM so that they keep the free cash. Hedge minutely by buying some stock |
| Learning Point | We found something that would have worked - just didn't take advantage of it /interrogate our result properly |

Cryptocurrency (by Apifiny Algo): Extremely arbitrary strategies where everyone loses money

Q: From historical nanosecond price data of 1 coin pair, trade to maximise PnL (C++, JSON)

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| Our interesting idea | Adapt and implement Moving Average Convergence Divergence indicator on a nanosecond scale  Did not code: Switching between mean reversion and dumping-slide paradigms |
| What failed | MACD's long period and short period is extremely arbitrary and we didn't have any formal motive for what is better or worse |
| Winner's idea | 90 minute EMA. Sell/buy whenever price crosses over/under. (Lame!!) |
| Learning Point | Everyone loses money and the more you trade the more you lose :( |