

Round 1 (RainforestResin, Kelp, Squid)

The products RainforestResin and Kelp were similar to the tutorial round and previous years and so they were no surprise here but the new product introduced: Squid showed the highest volatility and random spikes with seemingly no trend to exploit.



Source: prosperity.imc.com

For the first two, we traded around a fair price where if the ask price was below the fair estimate we would buy it and if the bid price was above the fair estimate we would sell it. Price of resin was stable around 10,000 and so a market-making strategy was also added, and after some tuning, a spread of 2.5 seemed to work best. For Kelp, a simple moving average with a window of 8 was used to estimate the fair price.

At the end of the round, we were ranked #1071th.

Round 2 (PicnicBasket1, PicnicBasket2 and individual products)

In this round, picnic baskets were index baskets that were made up of other individual products. PicnicBasket1 was made up of 6 Croissants, 3 Jams and 1 Djembes while PicnicBasket2 was made up of 4 Croissants and 2 Jams.

This was similar to round 4 of the previous year with the addition of an extra basket. The trading idea here was index arbitrage where if the price of the basket diverged too much from it's a constituent products it would indicate a trade signal as the price of the basket is likely to converge back to the sum of the prices of its constituents.

We explored two ideas, one where the synthetic basket of PicnicBasket1 was made up of 1 PicnicBasket2, 2 Croissants, 1 Jams and 1 Djembes, and other where it was made up of only individual items of 6 Croissants, 3 Jams and 1 Djembes. Using a z-score as the trading signal, we would short the index basket PicnicBasket1 if the price crosses the z^+ threshold and vice versa.

At the end of the round we were ranked #1388th.

Round 3 (VolcanicRock and 5 vouchers)

This round involved options trading using the Black-Scholes formula. By buying vouchers, we buy the right to buy the rocks at a fixed price at the end of the round regardless of the actual price of the rock. For example, if we buy a 7500-voucher for 500 seashells, for us to just break even by the end of the round, we want the price of rocks to be at least 8000 seashells for us to break even.

Results for our VolcanicRock algorithm showed mixed results, we ended up with a ranking of #1033rd.

Round 4 (Macarons)

Price of macarons were affected by various factors including import and export tariffs, sugar price and sunlight index. Our strategy was heavily inspired by 2nd place team Linear Utility from the previous year. However like them, we could not find any useful correlation between the features and the price through our own exhaustive experiments. We settled on a simple linear regression model using the current price to predict the future price on $t+7$ of the macarons at the foreign exchange with a suspicious R^2 value of 99%.

We implemented a volume-imbalance cross-exchange arbitrage strategy. A consistent large market taker was found where if best bid volume > 9 on the local exchange, a sell order placed at the best ask price was guaranteed to be bought. Leveraging this discovery, if predicted future implied prices at the foreign exchange using our linear model was below the current best ask price at the local exchange, we would place a sell order at the current best ask price with the intent on profiting from imports by buying back (placing conversions) at the foreign exchange in the next timestep.

Backtests showed minimal but consistent profits. However, a huge blunder with our volcanic rock algorithm resulted in a net loss of -82,558 seashells for algorithmic trading. We dropped to #1340th at the end of the round.

Round 5 (Insider Data)

We decided to not participate in this round's algorithmic challenge but instead use the time to consolidate our existing strategies. This round was based on alternative data where we were given information on other market participants in the hopes of leveraging this new information.

After 4 rounds, we finally found a strategy for squid after a hint from the wiki that exploited the long runs that price would go off to. We used a mean-reversion strategy as a bet that the prices would revert to its long term average. A long and short exponential moving average was used to calculate a z-score = $\frac{EMA_{short} - EMA_{long}}{\sigma_{long}}$ where if the z-score crosses the z^+ threshold we would sell short, and if it crosses the z^- threshold we would buy long.

With a brilliant result from manual trading and our new squid strategy, we were stunned to see our ranking skyrocket to #588th.