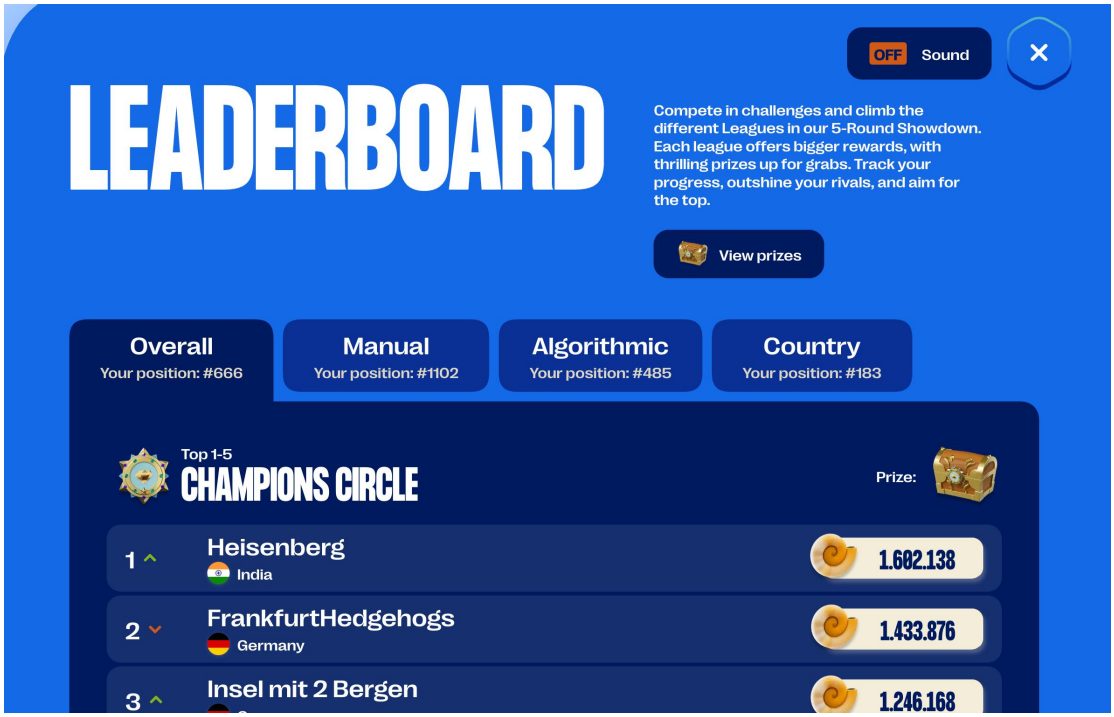
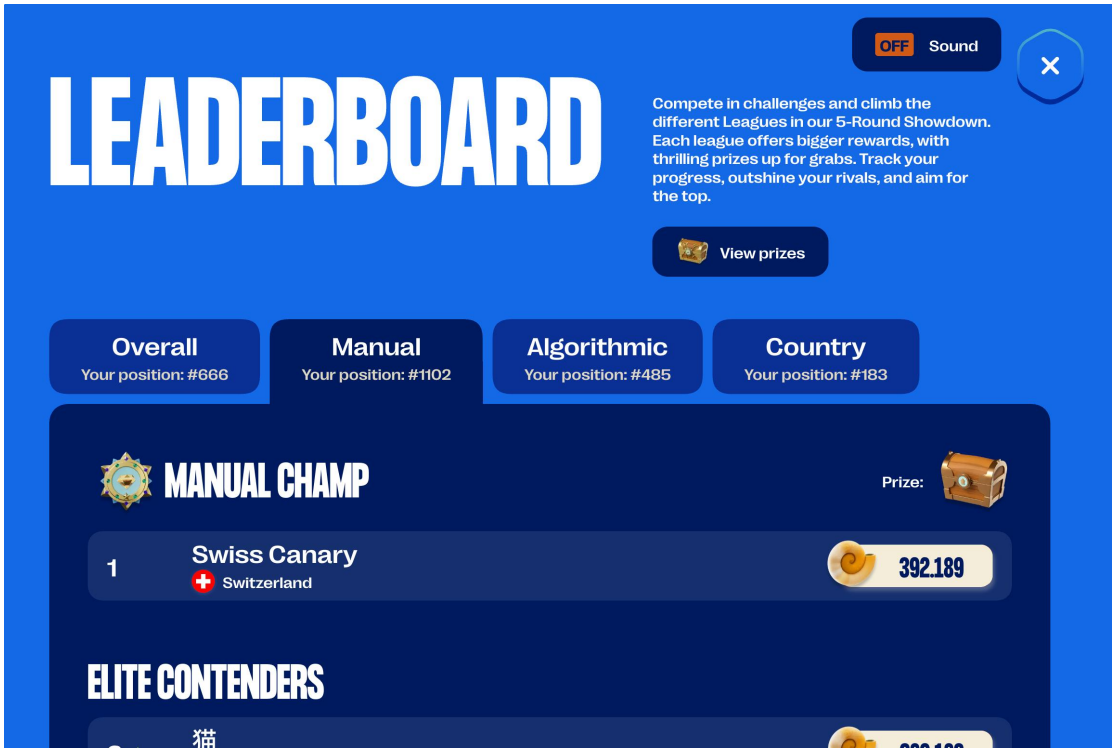
https://prosperity.imc.com/archipelago





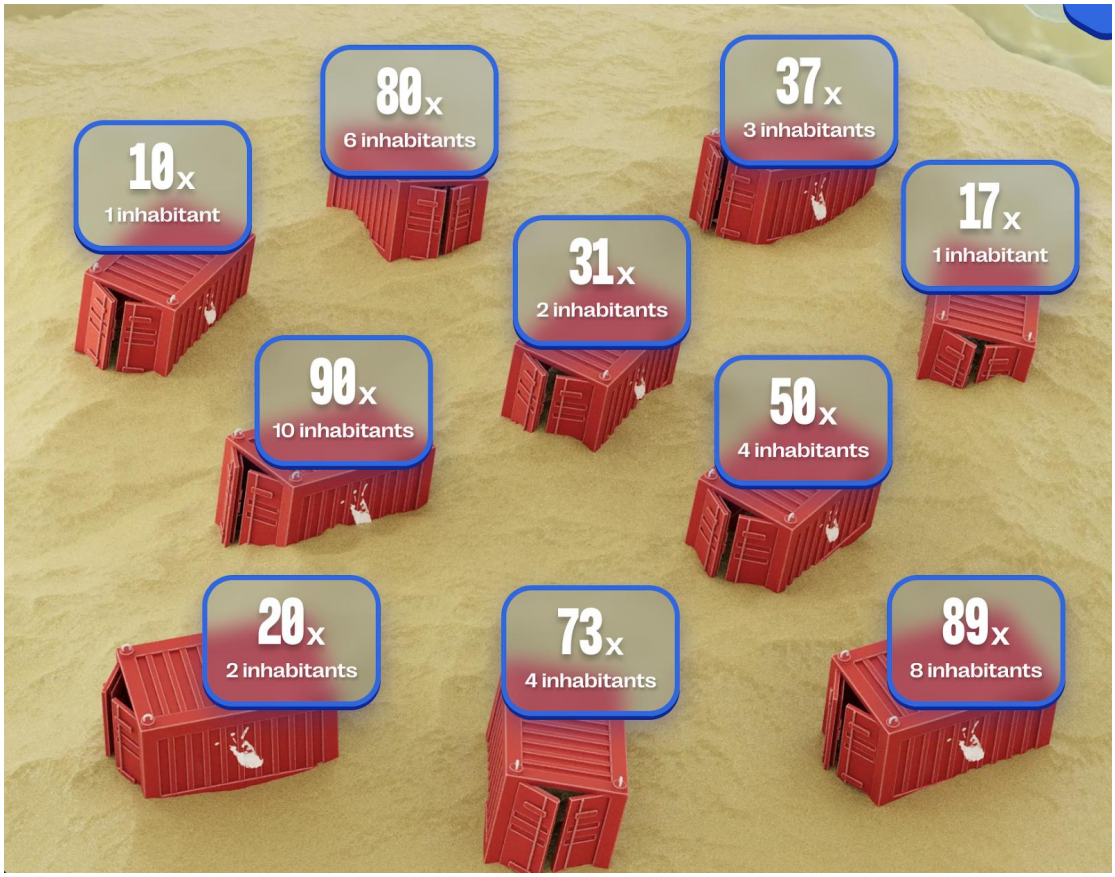
Round 1

Manual challenge

You get the chance to do a series of trades in some foreign island currencies. The first trade is a conversion of your SeaShells into a foreign currency, the last trade is a conversion from a foreign currency into SeaShells. Everything in between is up to you. Give some thought to what series of trades you would like to do, as there might be an opportunity to walk away with more shells than you arrived with.

		To			
		Snowballs	Pizza's	Silicon Nuggets	SeaShells
From	Snowballs	1	1.45	0.52	0.72
	Pizza's	0.7	1	0.31	0.48
	Silicon Nuggets	1.95	3.1	1	1.49
	SeaShells	1.34	1.98	0.64	1

Round 2



Each grid has a multiplier M, currently there are H hunters

Profit=7500M/(H+100P)

Building threshold functions and Maximin optimization strategies

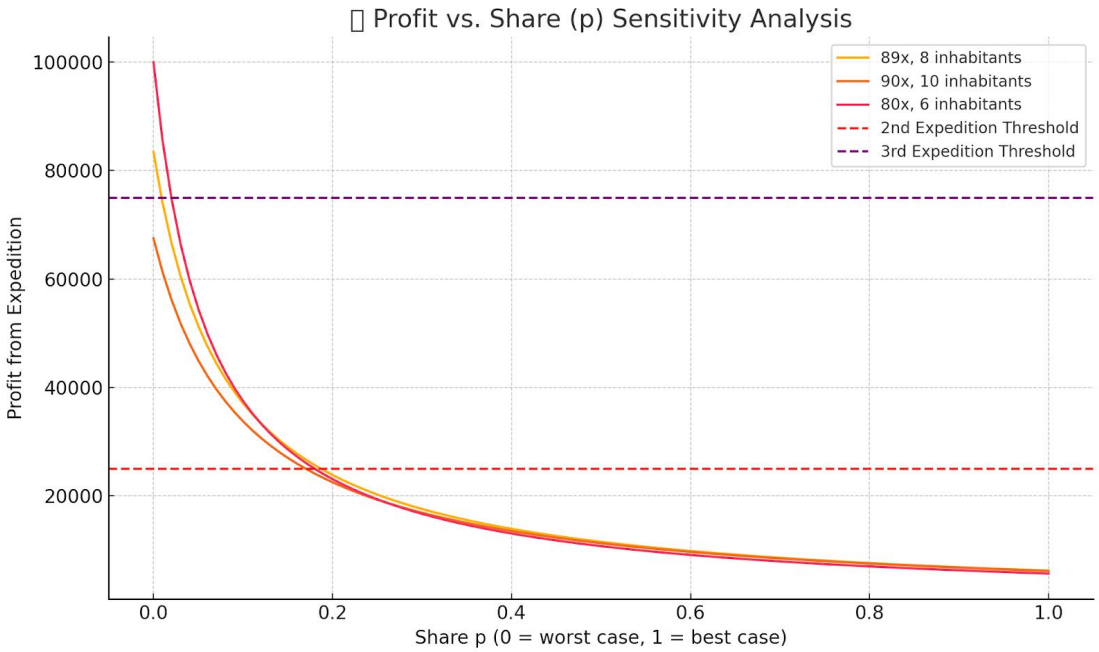
Use maximum2() to enumerate all combinations and call Mathematica's NMinimize to find the nested minimum value

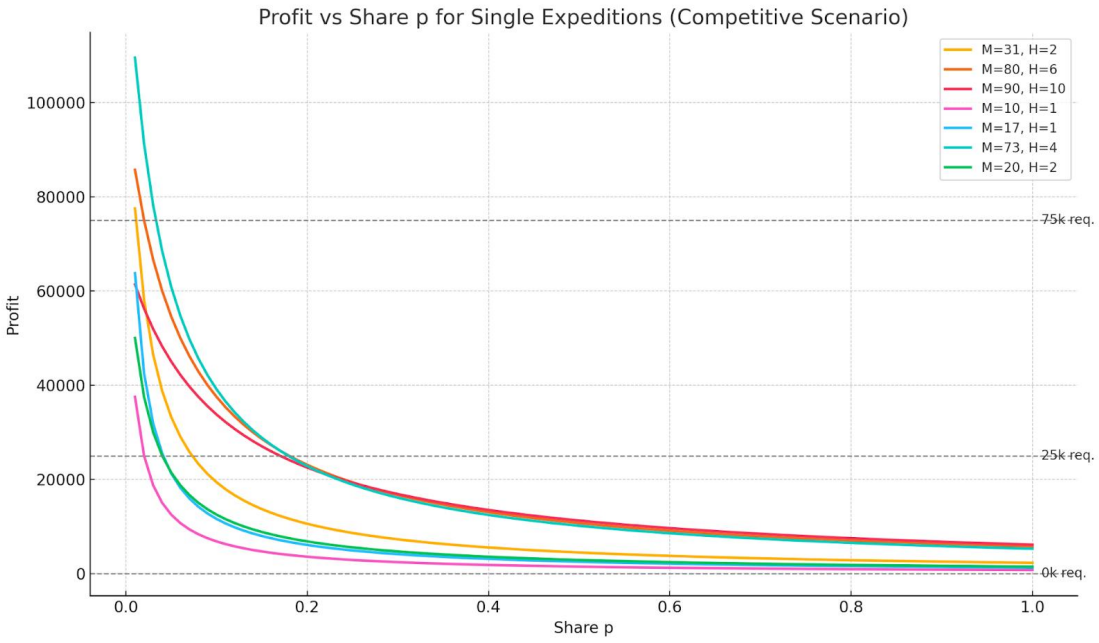
Three adventures

Add one (M_3, H_3) and then introduce p3:

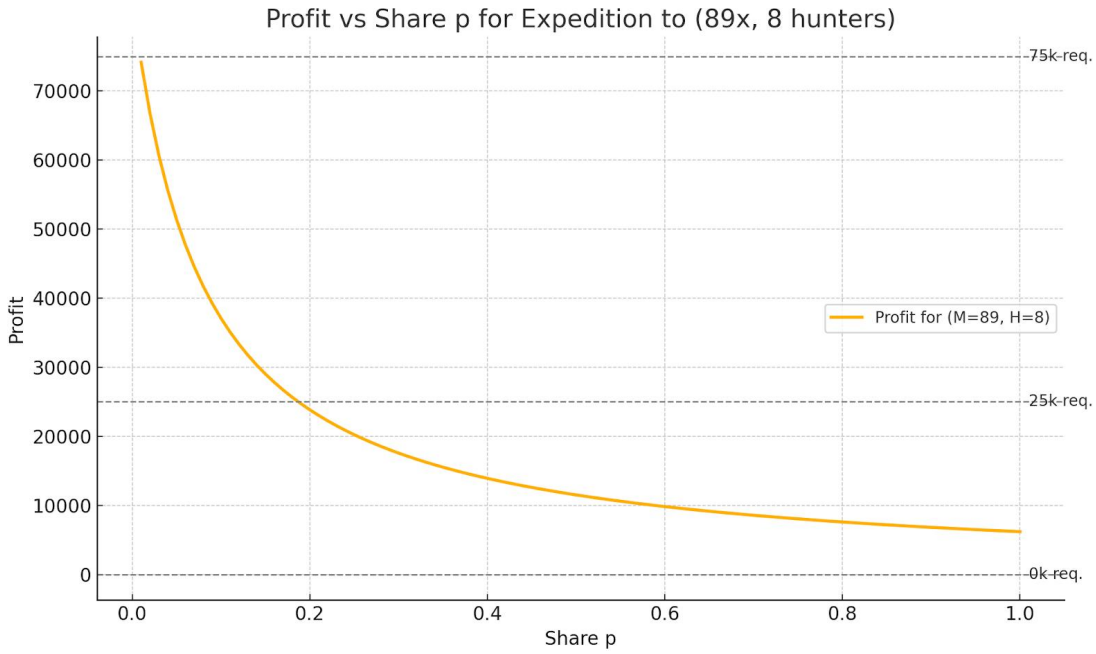
P1 +p2 +p3 ≤1

Implemented with maximum3()



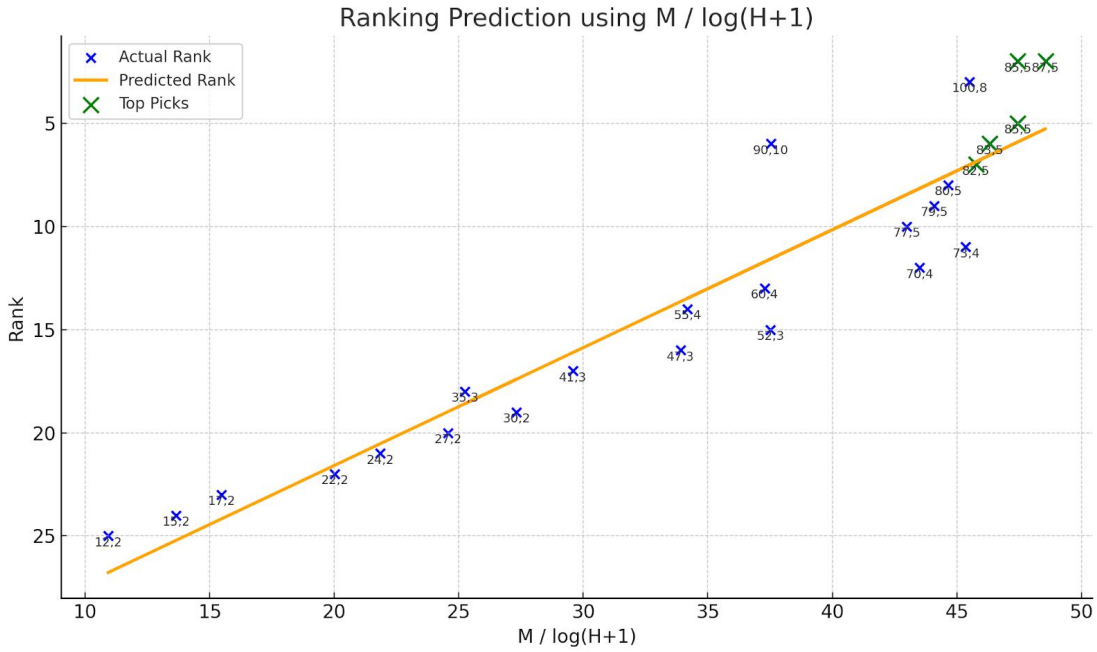


One destination: (89, 8) Minimum expected return: ≈ 6180.56



Linear model scoring

Strong correlation characteristics:
m / log(h + 1) R^2=0.889
m/sqrt(h) R^2=0.872
log(m) / h R^2=0.702
m/h R^2=0.403
e^(m/h) R^2=0.141. Sensitive to extreme values



First choice

(10x, 1 hunter)

(20x, 2 hunters)

Round 3

Transaction probability
If your second round bid is lower than the average bid of all merchants, you can still trade, but the profit of the transaction will be reduced proportionally, with the reduction factor being:

$p=(1000-\text{average bid})/(1000-\text{your bid})$

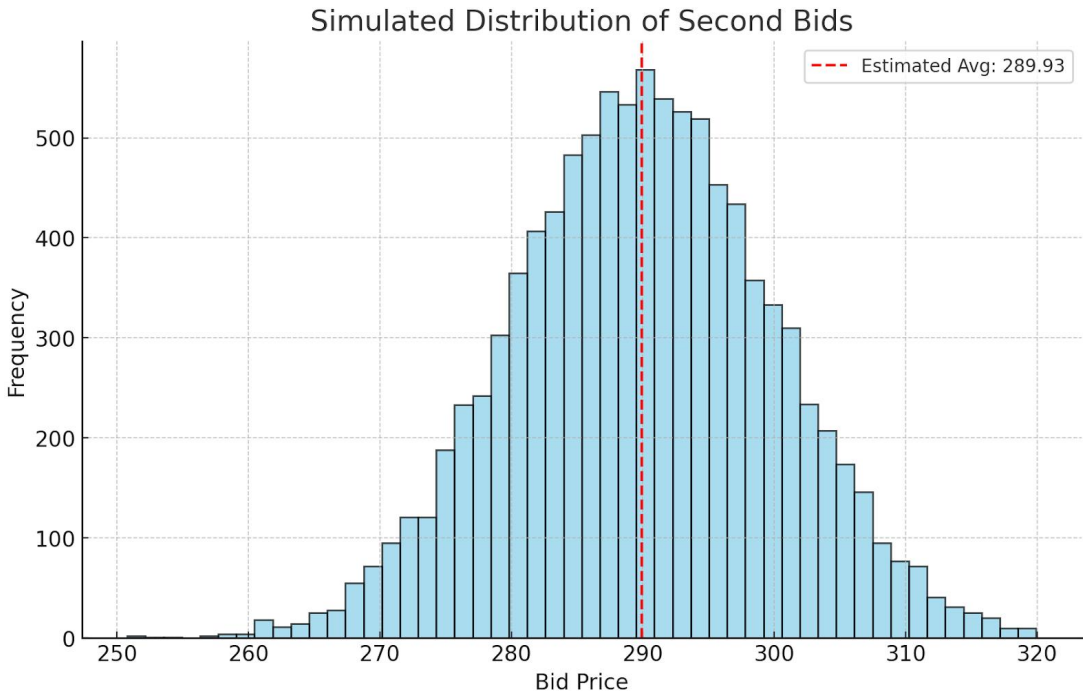
When bid is much lower than average bid, $p \ll 1$, the trading probability is very low

When bid approaches/above average bid, $p \to 1$ is easier to complete

second bid ≈ 280–290
pavg ≈ 285

Profit space
Suppose everyone is pursuing the maximum profit, use the solve(pavg) function to run repeatedly, find a set of equilibrium quotations under p_avg, and then introduce the concentrated range where others are most likely to quote.

If average bid = 289


Simulated Distribution of Second Bids
Estimated Avg: 289.93
Frequency
0
100
200
300
400
500
250
260
270
280
290
300
310
320
Bid Price

Whats your second trade

<200	13 票	19%
250-260	9 票	13%
260-270	5 票	7%
270-280	6 票	9%
280-290	5 票	7%
290-300	9 票	13%
300-310	3 票	4%
310-320	17 票	25%

区间	中点估计	投票数	占比	权重贡献
`<200`	190	13	19%	190 × 0.19 = 36.1
`250–260`	255	9	13%	255 × 0.13 = 33.15
`260–270`	265	5	7%	265 × 0.07 = 18.55
`270–280`	275	6	9%	275 × 0.09 = 24.75
`280–290`	285	5	7%	285 × 0.07 = 19.95
`290–300`	295	9	13%	295 × 0.13 = 38.35
`300–310`	305	3	4%	305 × 0.04 = 12.2
`310–320`	315	17	25%	315 × 0.25 = 78.75

Average_bid = 261.8

Round 4

问题陈述

注意： 此问题是第一轮问题的扩展。

金鱼们带着更多的**潜水装备**回来了。每条金鱼的保留价格会更新，但仍然遵循与第一轮相同的分布。

你的交易选择与之前类似。你仍然有两次出价的机会，每条金鱼会接受高于其保留价格的最低出价。但这一次，在你的第二次出价中，金鱼们还会考虑群岛上其他交易者的第二次出价的平均值。当你的报价高于所有第二次出价的平均值时，金鱼会与你交易。但如果你的报价低于平均值，成交的概率会迅速下降。

为了模拟这一概率，如果你的第二次出价低于所有第二次出价的平均值，则从该交易获得的利润 (PNL) 将按以下因子 p 进行缩放：

$$p = \frac{1000 - \text{平均出价}}{1000 - \text{你的出价}}$$

你能从现有数据中学到什么？如何预测这一新的动态并做出最佳决策？

Round 5

750,000 SeaShells Trading funds need to predict the rise and fall of goods based on the Iceberg news in the Northern Islands, and buy and sell operations in advance to make a profit.

Transaction fee = square of transaction ratio for each commodity × 90

商品	新闻摘要分析	情绪	预期收益率
Haystacks	干草堆正处低谷，Sheddit 社区发现稀有“珍珠针”，有潜在复苏迹象	+ 潜在利好	5%

Ranch sauce	成功收购 + 限定纪念包装，价格固定	++ 利好强	15%
Cacti Needle	导致列车脱轨，全国范围内面临更换	—— 强烈利空	-40%
Solar panels	新税法：成本上涨三倍，用户不满	— 明显利空	-10%
Red Flags	沙尘暴破坏大部分库存，修复需时间，不确定性高	- 弱利空	-5%
VR Monocle	爆发式增长，用户激增+使用时间破纪录，变成生活必需品	+++ 极大利好	25%

1. Sentiment

商品	情绪	含义
Refrigerators	+	小幅上涨
Earrings	+	小幅上涨
Blankets	——	明显下跌
Sleds	—	下跌
Sculptures	+	小幅上涨
PS6	+++	大幅上涨
Serum（胡须液）	——	明显下跌
Lamps	+	小幅上涨
Chocolate	-	小幅下跌

2. Returns

情绪	收益率
+++	25%
++	15%
+	5%
-	-5%
—	-10%
——	-40%
——–	-60%

3. Model
Optimize functions

$$\max \sum (7500 \times r_i \times p_i - 90 \times p_i^2)$$

ri : expected rate of return on goods
Pi: The investment ratio allocated to the commodity (positive value is buy, negative value is sell)

max sum(10000xRixPAIi - 90PAIi^2)

Constraints:
Sum of absolute values of all proportions ≤ 100%
The total investment ratio shall not exceed 100%

商品	操作	比例	理由
VR Monocle	买入	25%	最大利好，收益预期最高，重仓
Ranch sauce	买入	15%	并购完成，市场扩张
Haystacks	买入	8%	潜在复苏，社区挖掘珍稀成分
Cacti Needle	卖出	-20%	国家层面更换，预期崩盘
Solar panels	卖出	-12%	税收上涨影响使用率

Red Flags	卖出	-5%	短期混乱、修复还需要很长一段时间，谨慎做空