Path Of Exile's Metagame Analysis

In this analysis we will study the case of parrallels markets in a game and how th player can use it for making profits.

Intro

Description of the trading mechanic :

POE is an hack n slash rpg from GGG in which the trading has a key part for progressing in the game.

In POE you can trade your currencies for stuff or other currencies, within the game with PNJ or outside the game with other players.

To trade with others you should use an external website where every order is shown to everyone, like 'POE.trade'.

In addition some website can show you the evolution of prices across 120 days, due to some regulation of the POE API. But in contrast with almost every other multiplayer-onlibe games there no fees to trade with other players or with PNJ. The regulation come, except few examples, from the need and the offers of the playerbase.

The player can ingame transform currencies only in this order :

wisdom -> portal -> transmutation -> augmentation -> alteration -> jeweller -> fusing -> chance -> scouring -> regret -> alchemy

with some arbitrary conversion rate for each conversion.

Problematic :

During my playtime a question came across my head : Is there any benefits in hybrid trading ?

We'll try to found out if using hybrid market and conversions can help the player to make profits

Methodology :

For the collect and cleaning of the data I used google spreadsheet. Then for the visualisation and analysis Python(Pandas).

In [45]:
```
#Import of libraries
import numpy as np
import pandas as pd
%matplotlib inline
```

A-Patterns

First Case : Softcore trading patterns analysis

The first analyse should determine if there any profit avaible to the player buyng currencies on the external market, then transform them in the ingame market and finally selling them back in the external market.

I used both market prices to set up transfer conditions. There no exchange fee. I set up my data them in order to find where skipping the external market, and where getting back at it maybe beneficial for the player. Spreadsheet was used during this experimental phase.

In [46]:
```
#First dataset : Softcore POE Trade
softcore_trade = pd.read_csv('softcore_trade.csv')
```

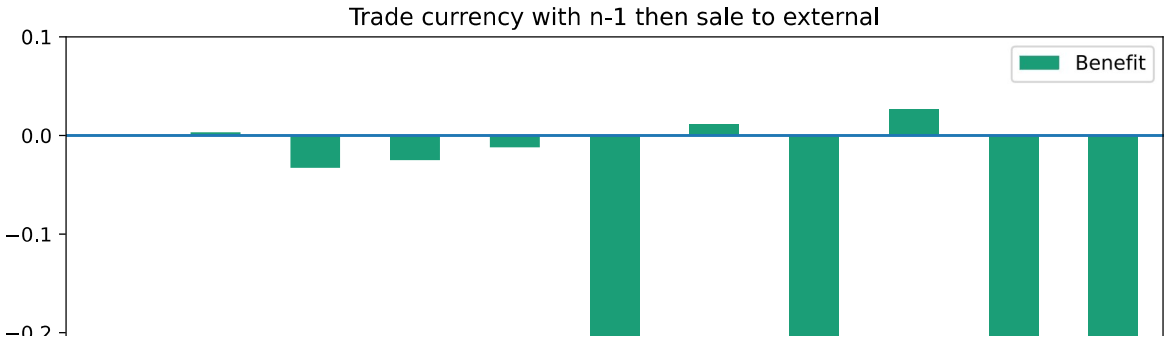
In [47]:
```
#Dataset 1
softcore_trade
```

Out[47]:

	Unnamed: 0	In-game change from to another	Chaos POE.trade price	Trade game to market	Benefit
0	Wisdom	1.00	0.0100	NaN	NaN
1	Portal	0.33	0.0400	0.013333	0.003333
2	Transmutation	0.14	0.0500	0.007143	-0.032857
3	Augmentation	0.25	0.1000	0.025000	-0.025000
4	Altération	0.25	0.3521	0.088025	-0.011975
5	Jeweller	0.50	0.1333	0.066650	-0.285450
6	Fusing	0.25	0.5800	0.145000	0.011700
7	Chance	1.00	0.0714	0.071400	-0.508600
8	Scouring	0.25	0.3930	0.098250	0.026850
9	Regret	0.50	0.3571	0.178550	-0.214450
10	Alchemy	0.50	0.2500	0.125000	-0.232100

In [75]:
```
#plotting the benefits
ax = softcore_trade.plot(ylim=(-0.55,0.1),kind='bar', x='Unnamed: 0', y='Be
ax.axhline(y=0)
```

Out[75]:
```
<matplotlib.lines.Line2D at 0x7fadf5166550>
```



The graph shows us that there is profit for the followings conversions :

- wisdom to portal
- jeweller to fusing
- chance to scouring

Moreover, this first analysis will help us later to identify wich trade we have to focus on.

Quick Analysis for hardcore playerbase

Following the same steps for hardcore playerbase we get :

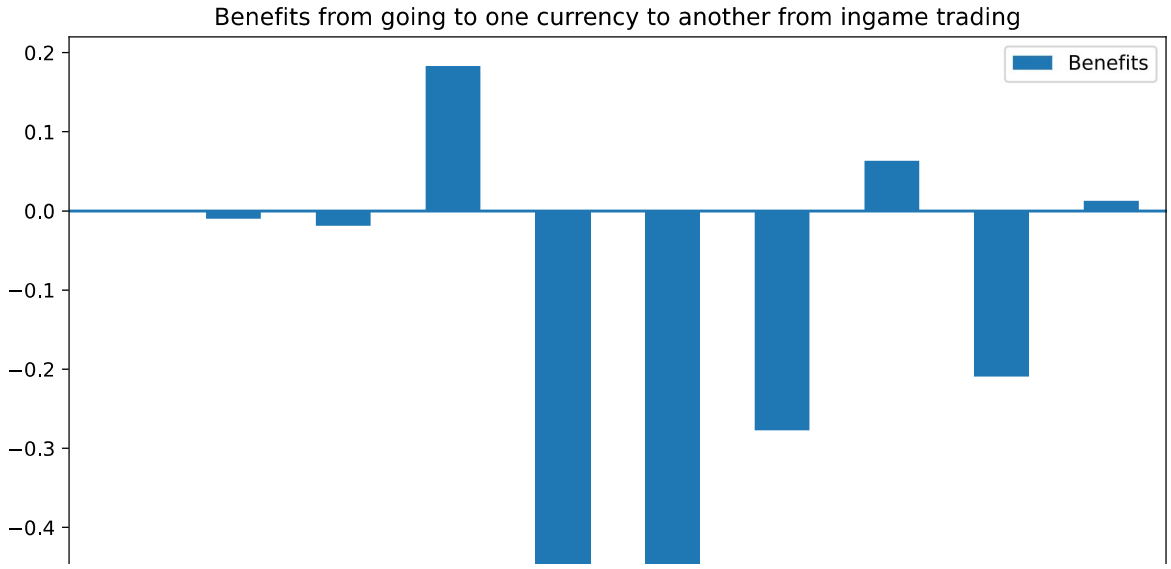
In [49]:
```
#Second dataset : hardcore POE Trade
hardcore_trade = pd.read_csv('hardcore_trade.csv')
hardcore_trade
```

Out[49]:

	Unnamed: 0	In-game conversion	Chaos value external	Sale	Benefits
0	Portal	0.333333	0.0133	0.004433	0.000000
1	Transmutation	0.142857	0.0250	0.003571	-0.009729
2	Augmentation	0.250000	0.0250	0.006250	-0.018750
3	Altération	0.250000	0.8330	0.208250	0.183250
4	Jeweller	0.500000	0.6250	0.312500	-0.520500
5	Fusing	0.250000	0.2857	0.071425	-0.553575
6	Chance	1.000000	0.0083	0.008300	-0.277400
7	Scouring	0.250000	0.2860	0.071500	0.063200
8	Regret	0.500000	0.1538	0.076900	-0.209100
9	Alchemy	0.500000	0.3330	0.166500	0.012700

In [67]:
```
#plotting the benefits
ax2 = hardcore_trade.plot(kind='bar', x='Unnamed: 0',y='Benefits',title = '
ax2.axhline(y=0)
```

Out[67]:
```
<matplotlib.lines.Line2D at 0x7fadf554fc10>
```



Without going into details, less trade offer are here, for example there is no trade wisdom -> portal.

Trends are differents, we can explain it by a different need of the public using this market. Here they use the best currencies for crafting items.

The other ones are lacking, because players scan in details the market.

Comparison between the two markets :

- Both markets have three positive conversion ingame.
- The best conversion for the softcore model is converting scouring to chance with 2% benefits.
- The best conversion for the hardcore model is converting alteration to jeweller with 18% benefits
- But only the hardcore market is able to make more than 10% percent on a currency. Wich is important for this kind of market with no regulations.

B-Focus

Focus on the conversion Jeweller to Fusing in the softcore model market

We will try in this part to analyze the complete cycle of purchase to sale for the Jeweller-Fusing trade in the softcore market

In [51]:
```
#import of the dataset
detail_trade_soft = pd.read_csv('Detail_jeweller_fusing.csv')
detail_trade_soft.head()
```

Out[51]:

	Purchase price(pour une chaos nbre de jeweller	Benefit (0.50 sale price)	Benefit (0.55sale price)	Benefit (0.6 sale price)
0	4.6	-0.43	-0.37	-0.31
1	4.7	-0.41	-0.35	-0.30
2	4.8	-0.40	-0.34	-0.28

	Purchase price(pour une chaos nbre de jeweller	Benefit (0.50 sale price)	Benefit (0.55sale price)	Benefit (0.6 sale price)
3	4.9	-0.39	-0.33	-0.27

This dataset was obtained with google spreadsheet. We gonna reproduce it using Pandas.

In [52]:
```
#initializing the range for purchases
purchase_number = np.linspace(4.5, 9, 100)
purchase_number
```

Out[52]:
```
array([4.5       , 4.54545455, 4.59090909, 4.63636364, 4.68181818,
       4.72727273, 4.77272727, 4.81818182, 4.86363636, 4.90909091,
       4.95454545, 5.        , 5.04545455, 5.09090909, 5.13636364,
       5.18181818, 5.22727273, 5.27272727, 5.31818182, 5.36363636,
       5.40909091, 5.45454545, 5.5       , 5.54545455, 5.59090909,
       5.63636364, 5.68181818, 5.72727273, 5.77272727, 5.81818182,
       5.86363636, 5.90909091, 5.95454545, 6.        , 6.04545455,
       6.09090909, 6.13636364, 6.18181818, 6.22727273, 6.27272727,
       6.31818182, 6.36363636, 6.40909091, 6.45454545, 6.5       ,
       6.54545455, 6.59090909, 6.63636364, 6.68181818, 6.72727273,
       6.77272727, 6.81818182, 6.86363636, 6.90909091, 6.95454545,
       7.        , 7.04545455, 7.09090909, 7.13636364, 7.18181818,
       7.22727273, 7.27272727, 7.31818182, 7.36363636, 7.40909091,
       7.45454545, 7.5       , 7.54545455, 7.59090909, 7.63636364,
       7.68181818, 7.72727273, 7.77272727, 7.81818182, 7.86363636,
       7.90909091, 7.95454545, 8.        , 8.04545455, 8.09090909,
       8.13636364, 8.18181818, 8.22727273, 8.27272727, 8.31818182,
       8.36363636, 8.40909091, 8.45454545, 8.5       , 8.54545455,
       8.59090909, 8.63636364, 8.68181818, 8.72727273, 8.77272727,
       8.81818182, 8.86363636, 8.90909091, 8.95454545, 9.        ])
```

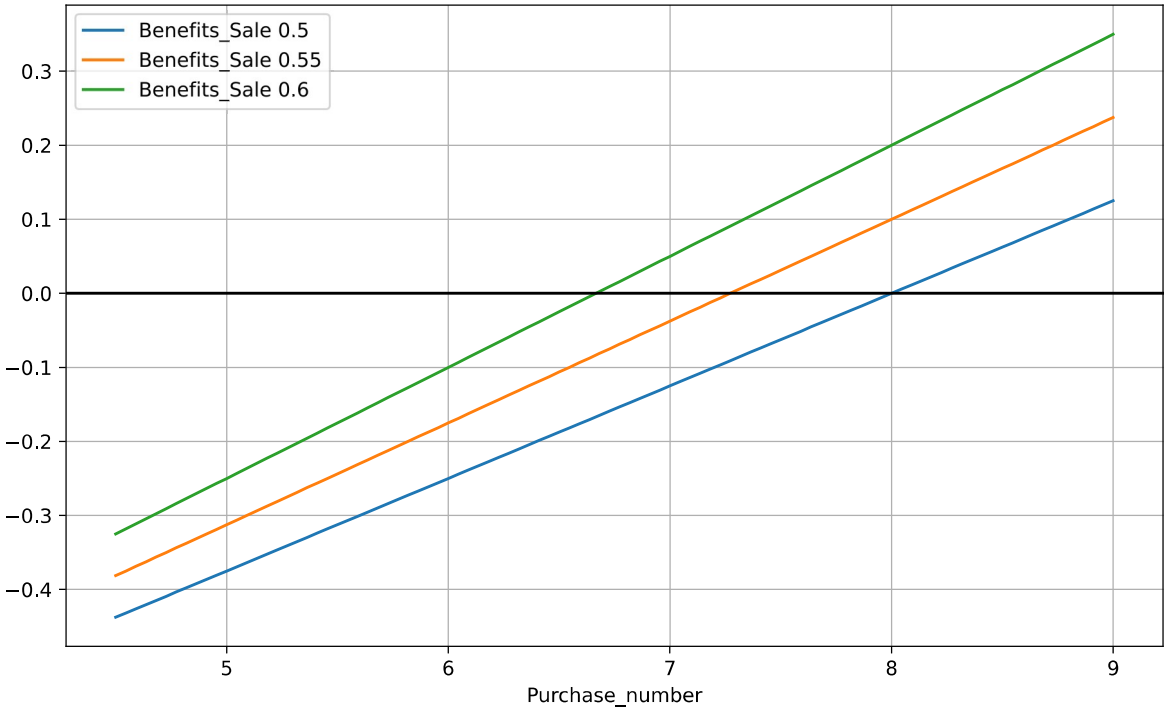
We get the formula for benefit : Benefit = (purchase_number / conversion_rate * sale_price) - purchase_price

In our case : Benefit = (purchase_number / 4 * sale_price) - 1

We'll take three differents scenarios : sale_price = 0.5, 0.55, 0.6

In [58]:
```
#
Benef1 = list(map(lambda x: x/4*0.5-1, purchase_number))
Benef2 = list(map(lambda x: x/4*0.55-1, purchase_number))
Benef3 = list(map(lambda x: x/4*0.6-1, purchase_number))
```

In [74]:
```
data = {'Purchase_number' : purchase_number, 'Benefits_Sale 0.5' : Benef1,'
df = pd.DataFrame(data)
figure = df.plot(x='Purchase_number', figsize = (10,6))
figure.axhline(y=0,color='k')
figure.grid()
```



Here we get in the details for the Trade Jeweller-Fusing, still using chaos orb as metric currency. As everyone does in this game, it's kind of euro or dollar for the POE market.

The graph above resume the differents scenario. For differents purchase price of jeweller in chaos, and differents sales price of fusing in chaos.

We took this three scenario because they represent high, medium and low sales price. Between 5 or 8 Jewellers for 1 chaos we have the all-time prices market for the purchases.

Conclusion

We were able to determine that the hybrid market can be bebeficial for the player, in both softcore and hardcore mode. Plus we found out the best practices for the conversion chaos-jeweller-fusing-chaos to determine if there will be profits or not for the player.