Zeny: An Ethereum-coupled price system

Old Draft 2 Version

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1 Introduction

We introduce Zeny, a fully decentralized, scalable and non-collateralize stable price system. The price system revolves around the following assumption, "A fully decentralized stable coin must possess an external utility to survive negative demand shocks". In other words, there must exist a high demand for secondary usage completely independent from the demand for a medium of exchange.

Suppose, we issue zenies for a dollar each. Every zeny credits a dollar worth of Internet services from Zeny foundation. Individuals holding zenies could redeem a dollar worth of Internet services or use zenies as a medium of exchange. Some other examples of such monies include mobile-minutes in Kenya, cigarettes in prison.

Problems arise when,

1. The promise of providing a dollar worth of Internet services cannot be upheld anymore by Zeny foundation.
2. The demand for Internet services ceases to exist.

We elect a group of Internet service providers, { Zeny foundation, Anet, Bnet, ..., Znet }. There must exist at least a single honest Internet service provider to prevent statement 1. Statement 2 though highly unlikely would result in the collapse of the price system.

For this paper, we attempt to model a similar price system around Ethereum. We use the demand for usage of Ethereum instead of the demand for Internet services.

2 Upholder incentive

Upholders are ethereum validators that promise to provide a dollar worth of Ethereum service for a zeny. We incentivize ethereum validators to participate in our price system using Casper proof-of-stake rewards. Let us assume the final Casper specification rewards 7% per annum. The validator rewards are proportional to the staked ethers. The validator rewards by participation in proof-of-stake through Zeny would always be higher than independent participation.

- **Independent participation:** Validator A stakes 100 Ethers in Casper contract. The reward received per annum would be 7 Ethers.
- **Zeny-upholder participation:** Validator A stakes 100 Ethers in Zeny price-system contract. Say, the amount of Ethers representing outstanding zenies equals 200 Ethers. The reward received per annum would be 7% on 200 + 100 Ethers approximately 21 Ethers.

3 Distribution of Rewards

The rewards can be classified into two types,

1. **Independent validator reward:** The rewards upholders receive from their individually staked ethers.
2. **Zeny-Ether pool reward:** The rewards upholders receive on the ether pool of the all outstanding zenies.

Zeny-Ether pool rewards are distributed proportionately to the number of zenies processed by each upholder. Every upholder has a reputation or number attached. The reputation increases for every processed zeny by removing that zeny from the system. Assume we have five upholders competing for the rewards pool of 2000 ethers. Every upholder starts with a zero reputation. After time t and 100 zenies processed, we have the following reputation state. Upholder a = 40, upholder b = 20, upholder c = 20, upholder d = 10, upholder e = 10. The distribution of rewards from the zeny-ether pool would be proportionate to their reputation. Upholder a receives 56 ethers, upholder b 28 ethers, and so on.

4 Algorithmic stabilization

We rely on the rate of interest mechanism to incentivize contraction without inflating the supply. The zenies holders pay a stabilization fee to the other holders temporary reserving their zenies.

- **Negative demand pressure [Price below a dollar]:**
  Zeny holders can temporarily reserve their zenies for time t at interest r. Interest r would be timely re-calculated based on market pressure. The reserved zenies are temporarily removed from the supply. The interest gained on reserved zenies is diluted from the other non-reserved zeny holdings in the form of stabilization fee. A seigniorage value transfer without inflating the supply, unlike seigniorage value transfer due to inflation.
- **Positive demand pressure [Price above 1.20 dollar]:**
  We provide a 20% upper elasticity to take advantage of positive demand. When a zeny is worth 1.21 cents, we issue new zenies for 1.20 cents, allowing arbitrage opportunities.

5 Troublesome states

1. **Price of ether drops by 70% and the price of zeny drops by 70% rapidly at the same time:**
   The upholders would be processing zenies at a loss equal to the number of ethers worth a dollar - the number of ethers worth a zeny. Upholders have to choose between processing transactions in ethers or transactions in zenies to include in the block. Assuming the demand for usage of ethers still exists despite price drop, we may see a positive demand for zenies due to the discounted rate. And if the demand for usage of ethers reduces, upholders would be receiving fewer transactions in ethers allowing them to include zeny transaction in the block rather than vacant space.
2. **Demand for usage of ethereum cease to exist:**
   In a case, decentralized applications fail to provide value to users, zeny would collapse.

6 Conclusion

Zeny scales with demand and usage of Ethereum. Similarly, validators of other networks from Web 3.0 such as Polkadot, Cosmo can participate to strengthen the currency of the blockchain Internet.