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The ZZOO Protocol: an Enabling Trade and Reallocation System for the New Blockchain Distributed Technology

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POTENTIAL FOR TRANSFORMATION

- **The new blockchain distributed digital technology has a potential to move toward an efficient P2P economy with no transactions cost and with perfect information.**
- **As was shown by the neoclassical economic model such an economy is welfare maximizing.**
- **The economic governance of such an economy is a self-organization where everything is decentralized and distributed. Individuals control both production and consumption without a need for central management.**

THE CRITICAL ROLE OF TRADE AND REALLOCATION SYSTEM

- **The major feature of the modern economy described and discussed by Adam Smith and later developed into the neoclassical exchange economy model is the process of: specialization in production-trade among individuals-maximizing welfare through variety of demand.**
- **The critical component of this process is a trade and reallocation system.**
- **The existing money-based trade and reallocation system was introduced to get over a problem of transactions cost. This trade system requires monitoring cost that led to central control expressed in a complex organizational and legal structure.**
- **The new blockchain distributed digital technology calls for a new trade and reallocation system.**

FEATURES OF THE NEW TECHNOLOGY THAT AFFECT THE TRADE AND REALLOCATION SYSTEM

- **Blockchains and smart contracts replace organizations, agencies, and contracts as the building blocks of the economy (and the society).**
- **Cryptographic and similar mathematical procedures replace legal, regulatory and political trust-generating arrangements.**
- **A trade and reallocation system needs to be able to effect trade and reallocation services across a number of blockchains which are based on distributed data base, P2P transmissions, pseudo anonymity, irreversibility of records, and computational logic.**

WHAT IS BEING TRADED AND REALLOCATED?

- **The items subject to trade are digital representations of wants of people. They are represented as rights for a state contingent services or a goods. The tradeable items are registered on blockchains and they are governed by a set of deterministic trade rules.**
- **The items traded on the new trade and allocation system are similar in concept to Arrow-Debreu temporal, periodical, state-contingent claims on life-time consumption in a world of no transactions cost and perfect information.**
- **One of the important requirements is that the digital representations are traded within and between blockchains in a seamless way.**

THE ZZOO PROTOCOL: AN EFFICIENT BARTER TRADE AND REALLOCATION SYSTEM.

- **The zzoo Protocol is a direct barter periodical trade and reallocation system. It is similar to the non-monetary sequence economy trading model.**
- **Like the economy sequence model the zzoo Protocol is a self-organization with no owners.**
- **Trade and reallocation via the zzoo Protocol are done in a sequence of finite intervals with fixed relative prices in each interval.**
- **The zzoo Protocol is operated by maintainers.**

THE OPERATORS OF THE ZZOO PROTOCOL.

- **The zzoo Protocol enables swap of any token to any token regardless of which blockchain they reside on.**
- **Trade begins where given the announced prices in an interval an individual (a trader) wishes to exchange a number of tokens that she/he owns with a number of other token(s).**
- **Maintainers are looking for a chain of pairwise transactions given the demand and supply of all traders at the interval such that the original demand, or a part of it will be satisfied at the announced prices at the beginning of the interval.**
- **In each round of pair matching, the goal is to maximize the volume of possible exchange**
- **The search and execution cost of the maintainers is close to zero**
- **Transactions are executed in a fair and neutral way**

WHO ARE THE MAINTAINERS?

- **The maintainers are part of the production process.**
- **The fee paid by the traders and the investment in time and in money determine the factor price of the service provided by the maintainers. The ROI on the investment of the maintainers is determined competitively in the market.**
- **All the information about past and current prices of traded tokens, the POS of existing maintainers and the distribution of current requests past trades by size and by pairs of tokens is freely available to everybody.**

THE ZZOO PROTOCOL AS CORE ALLOCATION.

- **The zzoo Protocol can serve any number of traders and any volume of trade and reallocation.**
- **The outcomes of the trade and reallocation via the maintainers are core allocations; equilibrium but not Pareto efficient.**
- **As the flow of trade and the way that the maintainers operate create a continuum of transactions it can be shown that over time as the volume of trade increases the core allocation will tend to become a Pareto efficient competitive equilibrium.**

THREE QUESTIONS

Like other metamorphic technologies the new blockchain distributed technology arises a number of questions about the future changes. The following are three examples:

1. **Can the economy survive without money and capital markets and without monetary policy?**
2. **Is it possible to have production without firms? What about economies of scale?**
3. **What about national states?**

CAPITAL MARKET AND ALLOCATION OF CONSUMPTION OVER TIME

- **The main role of the capital market is to allocate consumption across individuals and over time. The capital market is a complex B2B system dominated by governments and financial intermediaries. It operates with high costs of monitoring and opportunistic behavior.**
- **The new blockchain distributed technology provides individuals with the ability to jointly create a market where they can register digital representations of their capabilities (their supply) and their wants (their demand) on blockchains and to set up rules of trade using smart contracts.**
- **The zzoo Protocol provides service of allocation consumption over time through an efficient and almost costless barter trade of digital representations (tokens) of current and future consumption.**

WHAT ABOUT MONEY AND MONETARY POLICY?

- **Money is discussed in monetary economics as medium of exchange and a store of value, but fiat money is also a way by which government control and manage the economy.**
- **The role of money as a medium of exchange and a store of value is replaced in a world of the new blockchain distributed technology by a more cost effective barter trade in digital representations registered on blockchains and operated by deterministic computational rules.**
- **When the new technology becomes universal government management and control will be replaced by self organization as described by the Arrow-Debreu and the sequence economy non-monetary models.**

COEXISTENCE OF DIFFERENT COMMUNIITIES

- **As the new blockchain distributed technology and the appropriate trade and relocation system develop blockchains economies will be created with connections to the rest of the economy through exchanges of crypto to fiat money.**
- **The blockchains economies will be a P2P sectors in an economy which is primarily B2B. They will develop where P2P offers better solutions than B2B. This process is already evident.**

PRODUCTION AND ECONOMIES OF SCALE

- **In a blockchain distributed technology production will take place by individuals and temporary flexible grouping of individuals.**
- **Successful innovation will be rewarded by temporary and challengeable rents accrued to all involved.**
- **The organization, physical capital economies of scale will be replaced by distributed seamless economies of scale based on accumulation of human capital.**
- **These processes are already taking place.**

WHAT ABOUT NATIONAL STATES?

- **The new blockchain distributed technology does not negates the role of the state.**
- **To the extent that the state is a way to supply services that people want in an efficient way, including emotional and identity services the new technology may generate better and more direct relations between the state and the citizens.**