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# GEO:

## Economy of Free Exchange

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# GEO: the Economy of Free Exchange

## Abstract

GEO is a decentralized platform enabling anyone to issue obligations and use them in exchange. This exchange system is set to become a supplement or an alternative for the traditional banking system.

## What's wrong with today's monetary and credit system?

Professional economists aren't the only ones who suspect there's something wrong with today's monetary and credit system. Anyone dealing with modern money and banks, and who had to face the devastating aftermath of economic crises had some thoughts about it. The consequences arising from the system's imperfection are diverse. Eventually, they sum up in such global problems as poverty, concentration of wealth in the pockets of a handful of stakeholders, financing wars, and even disturbing trends in ecology and culture.

In our opinion, there are but three fundamental disadvantages of today's monetary and credit system that result in those diverse negative outcomes: interest rate, centralization, and instability of prices.

### INTEREST RATE

For thousands of years, interest rate has been influencing social relations. There's even an approach in history of economy stating that economic development over millenia can be reduced to the fight of debtors and creditors. There are diverse theories describing interest rate, however none of them could totally protect it from criticism of religious and secular thinkers calling for prohibition or at least restriction of this practice. Lack of final resolution to the issue has to do with the fact that it's not always possible to empirically test economic theories, and that discussions regarding interest rate tend to go beyond positive economic theories to reflect opposition of different social groups, classes, and ideologies.

As for GEO, what's important is that interest rate is the lower threshold of any investment project's implementation. The lower the rate, the more projects can be implemented, therefore employment rate, as well as production and consumption rates of values will increase. Generally, it's true for any factor of production: the lower the expenses, the higher the revenue. Within GEO, one of the key resources,

i.e. credit, becomes free, which makes higher number of project more attractive to investors, which eventually increases social welfare.

The most important channel of issuance of today's national currencies are bank loans, which imply some interest rate.

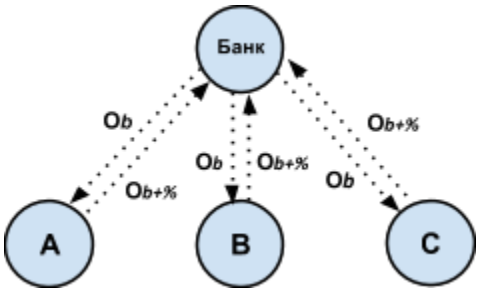


***Figure 1. Imprest of fiat money and its repayment***

Meanwhile, today's money is based on social credit. Why so? That's because everyone who accepts this money, which is the society, eventually credit its issuer, i.e. the bank, who classifies issuance of this money as 'liabilities,' i.e. debt.

Therefore, when a customer buys a product for fiat money, he or she effectively reassigns the issuer's debt holding to the seller (***Ob***). But **it's the seller that credits the customer**, not the bank, because it's the customer that the seller provides with goods in exchange for debt holding, i.e. fiat money.

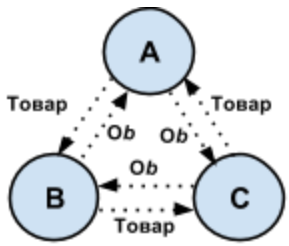


***Figure 2. Reassignment of fiat money in the process of commodity distribution***

This commodity credit is cleared when the seller buys goods from other sellers for this money, and so on. Every single day, across millions of transactions, economic agents grant each other a mutual loan by accepting debt holdings in exchange for goods.

As it turns out, in today's monetary and credit system, economic agents provide each other with mutual credit, but they're allowed to do that only by reassigning the debt of the issuer bank.

This poses the question: if fiat money is a bank's debt, what does the bank clear the debt with? Commodity channel of money issuance, when the issuer undertakes to clear the obligations with commodities, isn't really used these days. One of possible reasons for that is that money is produced by banks that produce nothing but money.

Banks can't clear their obligations with commodities because they produce nothing but their own obligations and services of storing and moving those obligations.

Therefore, we have a paradox: the interest rate is payable not by the debtor that creates obligations, but by the creditor that pays the debtor for the right to use their obligations as a means of exchange.

In fairness, it's worth mentioning that the burden of interest rate isn't the same across the world. The world isn't uniform: it consists of developed and developing economies. While entrepreneurs may have a credit only at a high interest rate in developing economies, central banks of developed economies run the interest rates to zero and even consider using negative interest rates and so-called 'helicopter money' to stimulate economic activity.

## CENTRALIZATION

These days, it's totally normal that central banks manipulate supply of money seeking to achieve some macroeconomic goals. There are quite impressive achievements in this realm, however, sometimes centralized monetary and credit policy (MCP) fails to succeed, or serves the needs of some pressure groups.

There are three basic problems in this regard:

- subjectivity of decision-making;
- failures in effective operations under centralized MCP;
- asymmetry in those decisions' consequences and responsibility for them.

As for subjectivity of decision-making, MCP, as previously noted, may address the needs of certain groups capable of lobbying their interests. For example, a central bank may artificially lower currency exchange rate for the convenience of exporters and at the expense of importers, and vice versa. A central bank may also save commercial banks that had gone bankrupt due to speculations, or just issue more money to cover non-production expenses of the government.

Failures in MCP's effectiveness consist in the fact that centralized decision-making involves a risk of using insufficient or corrupted information on the market, and that classic MCP tools aren't always efficient.

As is known, manufacturers and sellers can't have their credit directly from a central bank. They may have their money only from commercial banks, who either issue money themselves, or receive it from the central bank and then loan at a higher rate. Central banks may provide money to commercial ones to credit entrepreneurs and to stimulate stagnating economy, but commercial banks may burn this money on speculations thus further deteriorating macroeconomic conditions.

Practice shows that commercial banks use the right of providing access to money in an ambiguous manner. They may not just recklessly extend dubious credits, like it

happened before the global financial crisis, but also refuse to extend any credit, or inflate the interest rate when the demand for money is sky-high.

Neither central, nor commercial banks in fact bear no responsibility for deterioration of macroeconomic conditions due to inefficient MCP or aforementioned actions for the convenience of particular people, not the society.

Aside from it all, there is one more important consequence of centralized monetary governance, which is violation of privacy. It's not news that government entities may block access to a bank account, so that the owner would have no money. It's not news either that banks and government bodies have free access to data on transactions between all economic agents. Of course, controlling money turnover allows governments to tackle crime, yet the society pays with the right for privacy.

## INFLATION

Money damaging has a long history of financing government expenses, however, it became widespread only in the 20th century. World Wars I and II saw blockage of exchange of banknotes for gold and extended issuance of paper money for military expenses. This practice is known as 'inflation tax.'

One would think it's just about the government who exchanges goods for money it produces. If nation states produce fiat money, which is in fact its debt holdings, it would be just a commodity credit, not an inflation tax. However, there are at least two things worth mentioning here.

First, what are the commodities that the government clears its obligations with? The only legally established way to do it is to use fiat money as means of clearing tax obligations and other official payments.

Second, as government doesn't produce enough commodities to clear its obligations, the burden of clearing falls on the shoulders of all economic agents that use this money. If the supply of fiat money is ahead of the demand, it, just like any commodity, devalues. Increase of prices causes holders of fiat money to lose purchase power as creditors, while the nation state, as the lendee, wins. The question of what commodities it will use to clear the obligations is yet to be answered.

Inflation is all about reassignment. The process is evident both in various economic groups and international economic relations. From the economic groups' point of view, the prime victim of inflation is vulnerable social groups receiving steady income. Price upsurge on the background of steady income makes them poorer.

It's worth noting that value of money due to its excessive issuance doesn't decrease in a blink of an eye: it decreases gradually as money moves away from its manufacturer, the source of its issuance. Therefore, those receiving the new money earlier have greater purchase power than those who receive it later. Economy knows

this process as the Cantillon effect (named after 18th century British and French economist Richard Cantillon who was the first to study the process using circulation of gold money.)

In international economic relations, the inflation tax is receivable by some nation states at the expense of others. Issuer states of resserve currencies may ‘export’ their inflation, i.e. use benefits of additional issuance and reassign the burden of negative consequences on other countries.

The Cantillon effect is the reason why the followers of Ludwig von Mises oppose the concept of ‘overall price level.’ This overall index characterizes only changes in absolute prices while concealing changes in relative prices. In case of additional issuance, the demand doesn’t grow for all commodities at once, so someone always become richer, while others only lose. ‘Overall price level’ conceals the fact of wealth redistribution due to changes in pricing structure.

Similar to the case of interest rate, problems of developed economies are not the same as those of developing ones. Developed economies fight deflation (decrease of prices), not inflation.

Deflation, according to John Keynes, is way more dangerous for economy: as decrease of prices increases money’s purchase power, money holders refuse to invest and consume expecting further fall of prices that could increase their money’s purchase power even more. Business have to suffer losses as they become unable to sell their products at intended prices. This halts economic activity, and the government will have to prevent economic depression.

These days, monetary authorities of developed economies strive to launch inflation to stimulate economic activity and put a lid on their prolonged recession. One of the tools applied to stimulate economic activity is the policy of negative interest rates. It implies that depositors don’t receive their interest, but, on the contrary, have to pay for having a deposit account. Therefore, monetary authorities create a different mechanism of decreasing purchase power in the conditions of absence of inflation. This mechanism is set to incentivize economic agents to spend more and save less.

* * *

Today’s monetary and credit system is far from perfect, though it is much more efficient in terms of ensuring commodity exchange than millenia-old barter system.

GEO seeks to create an alternate exchange system, which:

- is based on mutual interest-free credit (as opposed to that of banks);
- is decentralized, so that participants could exchange directly, and nobody could prevent them from doing that;
- allows participants to loan commodities to each other, and settle their debts with their own commodities, i.e. exchange without money;

- ensures privacy of transactions, so that nobody has information on all accounts;
- makes it possible to choose any equivalent the participants deem appropriate.

GEO's purpose is to build this kind of economy of free exchange.

## GEO

### *What is GEO?*

GEO is an open-source protocol underlying a decentralized crediting network. In such a network, participants are connected with mutual agreements to credit each other to a certain extent.

On the one hand, the participants issue their obligations themselves to purchase commodities on credit. On the other hand, the participants choose themselves whose obligations to accept, i.e. to whom they sell commodities on credit, and to what tune. Therefore, GEO may be considered a decentralized system for accounting mutual obligations of crediting network participants.

### *How it works*

Operation of a decentralized crediting network is based on credit lines and obligations. Say, Alice opens a credit line for Bob and establishes a limit of 1,000 units. Those units could be a national currency, gold, bitcoin, or something even more exotic. Now Bob may receive goods from Alice to the tune of 1,000 units. In exchange, Alice receives Bob's obligation to provide his goods to her to the same tune of 1,000 units.

If Alice opens a 1,000-units credit line for Bob, while Bob opens a 500-units credit line for David, then David may have a credit from Alice for 500 units via Bob. This principle of reassignment of credit lines or obligations to a third party is known as the trust transitivity principle.

GEO is capable of finding and using trust chains of up to six links. Considering the rule of five handshakes, it might suffice for global settlements between economic agents that don't know each other. All participants just have to establish direct links to their closest circle of friends and relatives, so that the system's liquidity wouldn't be much different from that of the traditional system of exchanging commodities for money.

Remarkably, GEO automatically cross-charges obligations between participants. For example, Alice owes 1,000 units to Bob, who owes 1,000 to David, who, in his turn, owes the same to Alice. The closed circle is evident, and the debts may be

cross-charged, and GEO does that. This automatic clearing is effective for closed chains of up to six links.

### *So, is there money after all?*

Interested listeners may have already asked themselves whether there is any money in GEO, or not. In GEO, there are debt holdings of participants. The protocol may be used to create and reassign obligations of different kinds: bonds, promissory notes, commodity vouchers, and so on. Whether those obligations are money or not depends on what function they actually perform.

Let's consider the issue in detail, in terms of basic functions of money.

MEASURE OF VALUE. Obligations in GEO do not perform this function of money. In fact, the measure of value here is the equivalent chosen by the transaction's parties, which denominates the obligation.

MEANS OF EXCHANGE. GEO obligations perform this function as they're initially conceived as means of promoting free exchange. When a creditor reassigns their debtor's obligation to third parties in exchange for goods, this obligation functions as a means of exchange.

STORE OF VALUE. GEO obligations may be considered a store of value only when storage is considered a time gap between the acts of selling and buying. However, if store is understood, in John Keynes' terms, as demand for money under the motives of precaution, there are better assets serving those purposes. GEO obligations aren't intended for storage as there is no interest rate involved. Those obligations are not an equivalent that could be considered an object of storage, but only a counterparty's promise to provide the equivalent.

In strict terms, the number of GEO obligations one has accumulated does not describe the amount of savings. That's what one's balance (net store) is for: it is the difference between what they owe one, and what one owes their counterparties.

Therefore, GEO obligations are not money, but only credit means of exchange. They have no functions of value measure or store of value.

### *How about guarantees?*

In GEO, it's debt holdings, not national currency or cryptocurrency that are used for exchange. As participants just credit each other, there's a question of guarantees that a credit is finally repaid. Guarantees may be quite different: some transactions are based on verbal agreements and reputation of the debtor and the creditor, others are executed as a credit agreement, while still others don't become effective until a bail has been granted. GEO participants are free to choose the way to execute their credit relations.

The main feature of GEO is that only those participants that trust each other actually interact. As the network is decentralized, credit risks are localized therein. It's the participants who choose who to trust and to what extent by opening credit lines and establishing credit limits.

As opposed to the banking system, it is one's friends, relatives, and counterparties who determine their credibility, and each of them establishes their own credit limits. This decentralized knowledge of credibility is quite different from what a centralized structure like a commercial bank may know about one.

Another important point of difference between GEO and a banking system is that only the seller and the buyer can access the transaction data in GEO. Nobody else in the network has a full database of transactions.

Absence of a central authority prevents risks related to intermediaries that might corrupt, destroy or publish data on their users' transactions, or become a target for hackers. Additionally, all changes in governance principles have to be voluntarily approved by all members of the decentralized network on the basis of consensus.

Therefore, credit risk in the network is localized, and its extent is set by the participants themselves via establishing a credit limit. The risk of privacy compromising is limited because the network lacks an umbrella database of all transactions. There is no third party risk as the system is decentralized.

***How much is the participation?***

GEO is an open source protocol which may underlie various services, both free and chargeable. In its basic model, GEO is completely decentralized, and it has no administration that could receive any payments for servicing the system. Neither the system's administration (which is non-existent), nor intermediaries, nor providers of credit lines have any interest or payment for transacting. Using the network is free of charge.

Absence of fees allows one to use GEO as a protocol for microtransactions. Additionally, when all fees are steadily null, there's no risk of fluctuations, which makes the system more predictable.

## What happens when GEO is activated?

So, how is GEO different from today's monetary and credit system? To what extent does it overcome disadvantages of the traditional banking system?

## NO INTEREST RATE

GEO allows its participants to use interest-free credits and transact for free. What could it mean for them?

- As lendees, they have an opportunity of increasing the capital with an interest-free credit with flexible clearance term. The credit may buy both means of production and workforce. Additionally, sellers may buy goods from manufacturers on credit. There's always an option of extending clearance time via automatic reassignment of the right to use the trust line to a third party.

- As creditors, they increase their sales by selling on credit. Additionally, they may clear the credit with third-party goods via reassigning the receivables. Therefore, there is an option of using the debtor's debt to buy commodities.

- As GEO is a decentralized private system of obligation accounting with built-in clearing, all the participants may avoid expenses related to accountancy and transaction fees.

Such a crediting network may become an additional tool for an efficient MCP. It may be implemented by both central banks and local communities willing to improve their economic conditions.

## DECENTRALIZATION

GEO allows its participants to issue their obligations in a decentralized fashion, and credit each other directly, not via banks. Stimulation of economic activity originates in expansion of commodity credits that the system's participants provide each other, not in additional issuance of money by banks.

This grants cheaper and faster access to crediting resources for everyone who had established trusted relations within the network, not just for those who may access a bank's credit resources.

A decentralized system isn't prone to third-party risks: participants make their own decisions on establishing credit relations with their counterparties, and therefore are responsible for their own decisions. Absence of third parties and a public ledger of all network transactions ensure higher privacy level than that found in traditional two-level banking system.

## STEADINESS OF PRICES

GEO users may choose any equivalent for transactions within the network to insure themselves against devaluation of a national currency. GEO protocol allows the participants to open an unlimited number of credit lines in diverse equivalents. Apart

from traditional equivalents like fiat currencies, there could be various commodities or commodity bundles, or even such units as kilowatt of power or an hour of work.

THE SOCIAL EFFECT

We expect both economic and social effects from deployment of GEO. In GEO, economic relations are built not on state money, whose issuance and management the economic agents are deprived of, but on credit lines that the parties individually open for each other. Reputation of each participant gains dramatically greater significance here While reputation of a Central Bank's employees hardly influences the willingness of economic agents to use fiat money (we hardly even know who actually works at the Central Bank), in GEO, a participant's reputation seriously influences the willingness of their counterparties to accept their obligations in exchange for goods.

Therefore, GEO incentivizes its participants to accumulate reputational capital, thus motivating them to build long-term trusted relations with their counterparties. Additionally, when local communities use GEO as an additional exchange system, this would cause the same effect as local currencies, which have proven their efficiency as a social policy tool. First of all, it would result in decrease of social detachment, and would launch enhancement of non-commercial interaction within the community. This could improve living conditions of the entire community, not just a handful of its members.

***Other ways to put GEO to practice***

Apart from the fact that one can create diverse obligations in the GEO network, it's quite applicable for other purposes. It might become a loyalty system, or a system for p2p crediting. Absence of fees and high scalability make the network theoretically applicable in microtransactions of the Internet of Things.

GEO protocol decentralizes credit networks and other trusted networks where trust is calculated otherwise than in monetary units. For instance, it's applicable in e-messages systems to limit undesired communications, or in reputation systems.

GEO is an open protocol that everyone may use to create apps enhancing the quality of goods/information exchange.

## Contacts

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