

**Conferences, 2013**

**Conference on the political economy of economic metrics**

**28th January to 25th February, 2013**

## **Barter Utopia**

**a global redesign of economy**

### **Abstract**

*This essay proposes of a global redesign of the economy for the time where scarce resources will be counted as scrupulously as currencies are now, by maintaining free trade using barter instead of global financial markets. It figures out what could be the consequences of the use of barter markets of fungible values on a global scale, while maintaining use of money locally. Social questions related to individuals such as employment, health, housing and education could to be solved locally if the considered community had sufficient resources. Is it wise to aggregate a given metric outside of the territory where the measurement can be improved?*

### **Author details**

Olivier Chaussavoine, Software developer, author of openBarter

The author declares he is independent of any personal or professional link with any industry/companies or institutions

olivier.chaussavoine@gmail.com

## ***Value of a resource***

We propose to represent a resource by a couple (quality, quantity) where the quality is a name describing a quality standard and where the quantity is an integer, for example (Kg\_of\_flour,10). As an URL, the name can be as precise as necessary. Any fungible resource can be represented this way, including green house gases, radioactive pollution, surface of forest or even money. The value of a resource is simply measured by its quantity without any reference to a currency standard. For a given quality, the value is proportional to the quantity. The proportionality is limited by boundaries defining different markets such as gallon and barrel for petrol in England. But values with distinct qualities can only be compared subjectively by the market.

## ***Barter market***

The barter market accepts exchange orders of the form:

*I propose a value in exchange of a value of an other quality for a minimum quantity*

submitted by the owner of the value proposed.

The market finds potential exchange cycles with two partners or more. Agreements can be formed from them, defined by a set of movements where each partner provides a quantity to an other and receives at the same time a value of an other quality. By allowing more than two partners the liquidity of the market is not limited by the double coincidence of wants problem.

For an order, we define  $\omega$  as a ratio between provided quantity and minimum required quantity. The dimension of  $\omega$  depends on qualities exchanges and compare such values would not make any sense when these qualities are different. For a cycle formed by several orders where quality offered and required match, we compute an  $\Omega$  as the product of  $\omega$  of orders of a cycle. Since  $\Omega$  a dimensionless quantity, compare these values could have a meaning. When  $\Omega$  is lower than 1, the common will to exchange is not sufficient to find an agreement between partners due to minimum quantities required. When  $\Omega$  is 1 it is easy to find an agreement than match minimum ratio  $\omega$  required by maximizing the flow of values through the cycle within limits defined by available quantities. When  $\Omega$  is greater than 1 the excess  $\Omega-1$  can be shared fairly for the benefit of partners in order to form the exchange. This share changes  $\omega$  to a value  $\omega' = \omega * \Omega^{-1/n}$  where  $n$  is the number of partners so that the product of  $\omega'$  is 1. The value  $\omega'$  lower than or equal to  $\omega$  represents a benefit for the corresponding partner. The share is fair since the ratio  $\omega'/\omega$  is the same for all partners of the cycle.

When an owner submits an order, that's because he considers that the value expected is more useful than the one he owns, and  $\omega$  measures how much this exchange would be useful for him. For a given cycle  $\Omega$  is proportional to any  $\omega$  of its orders since  $\Omega$  is their product. In other words  $\Omega$  is an aggregate common to all partners of the cycle measuring how much the exchange is useful for them, even if usefulness depends on the view point. When a common order belongs to several possible exchange cycles, the author of this order can use  $\Omega$  as the measurement of the usefulness of potential cycles and compare them to choose the best. It has been shown<sup>1</sup> that the choice of the cycle having  $\Omega$  maximum is the same as what would be obtained with the best price rule when this choice is applied to bilateral exchanges. In other words,  $\Omega$  maximization extends the best price rule to non-bilateral exchanges. By maximizing  $\Omega$  the market meets the goal of utilitarians by maximizing utility but with a definition of utility that is independent of any currency.

The extension of the best price rule to non-bilateral exchange is not unique, and could also be obtained by maximizing individual profit<sup>1</sup> instead of utility. The use of money maintains a confusion between these two distinct goals with assessed social economic consequences.

This market proceeds as a regular market – a central limit order book (CLOB) - by processing orders one after the other. We describe here what is common between these markets. The input of the market is a flow of orders and its output is a flow of movements. It records unmatched orders in an order book. When a new order is submitted, a competition is performed between potential cycles created by the new order and pending orders in the book to choose the cycle that will form the exchange. If no matching is found, the new order is added to the book. Otherwise, movements forming the exchange are produced from the best cycle and the values offered by matched orders are decreased of the values exchanged. If some cycles remain the competition is repeated as long as the new order is not exhausted.

The difference between this barter market and a regular CLOB is only that 1) exchange cycles can be non-bilateral 2) competition is performed with  $\Omega$  instead of price. CLOB algorithm used by most important market places such as the New York Stock Exchange could be adapted to implement barter markets.

### ***Global barter***

Logistic questions are already solved by corporations. At any step of the logistical chain, Walmart knows the place and owner of each stock and the information defining their ownership depends on markets. Use of barter markets does not add any significant complexity to existing operational solutions.

Since money can be bartered as any fungible value, we propose to figure out a world where global financial markets would be changed to global barter markets connected to regional or local currencies.

Creation of money would become a local question to be solved under the control of global markets.

### ***Economy metrics***

Counting resources and pollutions as scrupulously as we are used to do with money would greatly improve the capacity of national governments and United Nations to limit locally or globally use of natural resources and production of wastes. It would also drastically increase their capacity to influence the behaviour of economy and to respond efficiently to the growing probability of hazardous events. Assets and liabilities of corporations could also be expressed by values such as defined here.

### ***Ecological discounting***

Discounting can be seen as a trade-off between short and long term. The persistence of the benefit or damage depends essentially of the quality of the value considered. Green house gases for example have average residence time in the atmosphere that depends on the gas specie (between 12 years for the methane and 50 000 years for the tetrafluoromethane). Biodiversity is a damage that will never be recovered while radiological pollution affects many hundred generations.

Discounting mechanisms used to maximize social welfare could be applied with distinct rates for

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<sup>1</sup> minimize  $\omega'$ , that is minimizing  $\Omega^{-1/n}$  or maximizing  $\Omega^{1/n}$  instead of  $\Omega$  .

each quality considered. Results of cost-benefit analysis would be expressed for each quality presenting a clearer vision of projects .

### ***Decrease inequality***

Inequality between populations and environmental questions are inseparable. By their participation to the global barter markets, countries providing primary resources would be able to preserve their mineral resources and eradicate poverty. The barter markets would decrease drastically the inequality induced by the use of dominant currencies.

### ***Adaptation of existing infrastructure***

The conversion of a global financial market to a barter markets with regional or local currencies is a vast challenge that requires a pragmatic approach based on experiments and progressive deployment.

Community currencies provides an opportunity to experiment this barter market. It would be for a group of adjacent communities the opportunity to exchange without affecting their monetary aggregates.

But many essential functions remain unchanged. Some institutions record the ownership of values, locally or globally depending of the quality considered, others maintain central registries of resource names, others define measurement standards of qualities, others offer services for traders.

### ***Conclusion***

The use of global barter markets would change the way we measure by redefining the territory where the measurement is useful, like physicists use microscope or telescope depending on the object observed. Barter would improve the efficiency of political decisions by providing means adapted to the scale of the considered problem and would reduce the threat induced by the financial crisis on the ecological regulation.