# The impact of the monetary system on economic growth and crises

It is generally considered desirable that the economy, whether at a local or a global level, should grow - that is, that the sum of economic activity should every year be greater than the last. Not everyone regards such continual growth on a finite planet as sustainable, and some thinkers have proposed taking the economy to a stationary state, or even advocated "degrowth" [1]. However, this does not seem to be possible in practice: periods of slow or negative growth usually coincide with rising unemployment, financial instability, bankruptcies, and other signs of social strife. This phenomenology cannot be explained by factors such as population growth or technological improvements, which are, in any case, proximate but not ultimate causes. What, then, forces economic growth?

It has been suggested that forced growth is one of the consequences of the main mechanism whereby money is created - namely, as credit issued by commercial banks [2]. This process is often ignored in classical economics because money is regarded as neutral; that is, as a medium for exchange the nominal value of which has no effect per se. But consider a simple model in which banks lend to a society who collectively repays the credit with an interest, generating an income for banks. The banks spend part of this income back into society, but a certain fraction contributes instead to their capital reserves. For certain parameter ranges and a constant capital reserve ratio, the total amounts of both money and debt in the system will grow exponentially, as is empirically observed. Furthermore, if GDP is incorporated (as the total activity performed by society in order to subsist and repay debts), it is also seen to grow exponentially in this regime.

The purpose of this project is to apply the techniques of mathematical and computational modelling to the problem of how the economy and the monetary system interact. Agent based models have been used in econophysics since the late 1990s (see [3] for a recent review), mostly focusing on distributions of income and wealth and related inequalities. While the notion of debt is included in some studies (see [4], Section 4.4 and references therein), the effects of the monetary system on the stability of the econnomy have not been studied systematically. This is the focus of this project, with a view to shedding light on the ultimate causes for the apparent necessity of economic growth, and the question whether the economy can stabilise under appropriate conditions. The recent, debt-induced economic crisis confirms that this is a highly relevant question, with little theoretical understanding or consesus among policy makers on how to address this.

**Details.**
The first step consists of a thorough review of the existing literature and public data, and the development and implementation of a simplistic model to explain the basic principles of the observed evolution of monetary supply and other relevant econometric quantities on a macroscopic scale. This is probably the scope achievable in an MSc project. If continued for PhD, in a second step this model can be refined in order to fit real economic data and enable future predictions. It can be used to inform policy makers on the validity and risks of alternative monetary systems that have been suggested in light of the recent crisis (see e.g. [5]). An interesting question in this context is also if there exists a feasible monetary system which does not require growth but allows for a stable economy, or if stability is even the most relevant feature of the system to be optimized.

**References.**

[1] Demaria, F., Schneider, F., Sekulova, F., Martinez-Alier, J. (2013). What is degrowth? From an activist slogan to a social movement. Environmental Values 22 (2): 191-215. http://www.degrowth.org/wp-content/uploads/2014/08/What-is-degrowth.pdf

[2] Michael Rowbotham (1998). The Grip of Death: A Study of Modern Money, Debt Slavery, and Destructive Economics

[3] V. M. Yakovenko and J. B. Rosser, Jr.. Colloquium: Statistical mechanics of money, wealth, and income. Reviews of Modern Physics **81**, 1703 (2009)
`http://physics.umd.edu/~yakovenk/econophysics/`

[4] Econophysics of Income and Wealth Distributions. Bikas K. Chakrabarti, Anirban Chakraborti, Satya R. Chakravarty, Arnab Chatterjee. Cambridge University Press (2013)

[5] `http://positivemoney.org/`

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