

SOE 6: Economic Models

Time: Monday 15:00–15:45

Location: H37

SOE 6.1 Mon 15:00 H37

Regulation of self-organized cartel dynamics via information dissemination — •TIAGO P. PEIXOTO and STEFAN BORNHOLDT — Institut für Theoretische Physik, Universität Bremen, Hochschulring 18, D-28359 Bremen, Germany

In a simplified model of a market where buyers are forced to buy from a predetermined number of sellers which they can choose, there occurs the emergence of a "cartel phase" where sellers agree on a higher average price, despite the lack of communication between them, and thus any agreement on a specific strategy. The onset of this dynamical phase is controlled by a single parameter which specifies the relative speed with which the sellers update their strategies, compared to the buyers. If this value is below a critical value, the cartel phase is replaced by an optimum for the buyers, where the prices become the lowest possible.

Recent legislative measures were proposed which intended to thwart this effect in actual gasoline markets. They consist in forcing the sellers to report any price change immediately, so that a global price repository can be built. We incorporate this regulatory feature in the model, and investigate the conditions necessary for the existence of the cartel phase.

T.P.Peixoto, S.Bornholdt, "No Need for Conspiracy: Self-Organized Cartel Formation in a Modified Trust Game", *Phys. Rev. Lett.* 108, 218702 (2012)

SOE 6.2 Mon 15:15 H37

Sectoral Gross Domestic Product composition: a dynamical modelling approach — •DIEGO RYBSKI, RAPHAEL LUTZ, MICHAEL SPIES, DOMINIK E. REUSSER, and JÜRGEN P. KROPP — Potsdam Institute for Climate Impact Research, 14469 Potsdam, Germany

Exploring a simple system of differential equations we characterise the transfer of GDP shares – i.e the partitioning into agrarian, industrial, and service sectors – between the sectors in the course of economic

development. The model fits for the majority of countries providing 4 country-specific parameters. Relating the agrarian with the industrial sector, a data collapse over all countries and all years supports the applicability of our approach. Depending on the parameter ranges, country development exhibits different transfer properties. Most countries follow 3 of 8 characteristic paths. The types are not random but show distinct geographic and development patterns.

SOE 6.3 Mon 15:30 H37

How does money memorize social interactions? Understanding time-homogeneity in monetary systems. — •ANDREAS SCHACKER, MATTHIAS SCHMITT, and DIETER BRAUN — Systems Biophysics, LMU München

How does money shape and memorize our social interactions? There are many schools of thought on as to how monetary systems contribute to crises or boom/bust cycles. Statistical physics can provide a refreshing perspective to probe the stability of monetary systems [1,2,3]. We analyze how credit mechanisms introduce non-locality and time-heterogeneity to the monetary memory. Motivated by an analogy to particle physics, locality and time-homogeneity can be imposed to monetary systems. As a result, a full reserve banking system [4] is implemented by a two-currency system of non-bank assets (*money*) and bank assets (*antimoney*). Payment can either be made by passing on money or by receiving antimoney. As a result, a free floating exchange rate between non-bank assets and bank assets is established. Interestingly, credit creation is replaced in this monetary memory by a liquidity transfer that simultaneously transfers money and antimoney at a negotiated exchange rate. We analyze this novel monetary mechanism under random social interactions. Analytical results for all relevant distributions can be provided, including an analysis of a fully transparent liquidity market. [1] *European Physical Journal B* 17, 723-729 (2000). [2] *Reviews of Modern Physics* 81, 1703 (2009). [3] *Physica A* 321, 605-618 (2003). [4] Ryan-Collins, Greenham, Werner, Jackson: *Where Does Money Come From?* positivemoney.org.uk.